SeeWay (v.3)
User's Manual

Version 1.1

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Chapter 1
Introduction

1.1   SeeWay Overview

SeeWay is a sophisticated, vision-based application that detects and identifies number plates on vehicles traveling at a wide range of speeds. It is a major component of HTS's VRS (Vehicle Recognition System) solution.

SeeWay runs on the VRS Controller, an Intel-based computer platform, and is implemented as a Windows 7-based application that acts as the recognition engine, performing all video and image processing activities.

1.2   Purpose of this Document

This manual describes the operation of the SeeWay application, which allows system operators to quickly configure and troubleshoot the VRS system.

1.3   List of Acronyms

Acronym	Meaning
AOI	Area of Interest
AGE	Automatic Gain and Exposure Algorithm
BW	Black and White
CB	Connection Box
DLL	Dynamic Link Library
FAQ	Frequently Asked Questions
GOP	Group of Pictures
GUI	Graphical User Interface
HASP	Hardware Against Software Piracy
HTS	High Tech Solutions Ltd.
HW	Hardware
IMO	International Maritime Organization
ID	Identification
IO	Input/Output
JB	Junction Box
LED	Light Emitting Diode
LPR	License Plate Recognition
MSMQ	Microsoft Message Queue
NIC	Network Interface Controller
OCR	Optical Character Recognition
OS	Operating System
PC	Personal Computer
PS	Power Supply
RMA	Return Merchandise Authorization
SCH	See Car Head
SDK	Software Development Kit
SI	System Integrator
SW	Software
TBL	Terminal Block
TOS	Terminal Operating System
VMD	Vehicle Motion Detection
VRS	Vehicle Recognition System

Table 1: Acronyms

1.4   Additional Support

HTS offers additional support on its web site. You can access the support section using the link: http://htsol.com/Support.asp Obtain a user name and password from your HTS representative.

The section includes contact information for technical support, a FAQ (frequently asked questions) page, RMA (return merchandise authorization) procedure, and a download menu. The following items can be downloaded from the site:

- ◆ Software Releases
- ◆ Drivers
- ◆ Documentation
- ◆ Tools and Utilities

You can contact us for more information and assistance at:

Telephone / Fax	Email
Telephone: +972-4-6774100 Fax: +972-4-6774101	Marketing / Sales: info@htsol.com Technical Support: support@htsol.com

Chapter 2
Main Window

2.1   Getting Started

The SeeWay application is executed automatically by the Windows operating system (following initial configuration of the system using the VRS Controller Configurator – see the *VRS Installation Guide* for further details). To initiate the SeeWay application manually, double-click on the SeeWay icon (shown in Figure 1 below).

Figure 1: SeeWay Icon

2.2   Window Structure

The SeeWay Main Window appears upon initialization of the SeeWay application, as shown below.
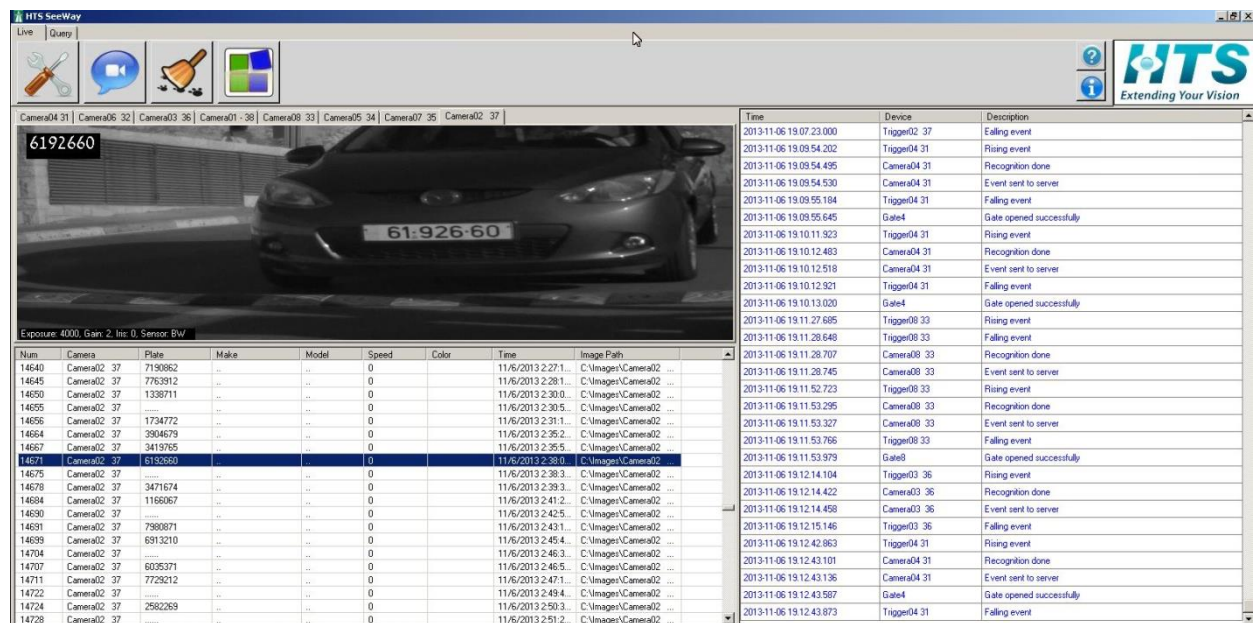
Figure 2: SeeWay Main Window

The Main Window contains two tabbed sub-windows, as shown in Figure 3 below:

◆   **Live.** The General tabbed sub-window provides access to most SeeWay system functionalities, including configuration, event and log viewing, and live video.

◆   **Query**. The View tabbed sub-window provides access to all still images photographed by the SeeWay system.
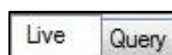
Figure 3: Main Window Tabs

2.2.1   Live Tab

The Live tabbed sub-window is divided into the following sections:

◆   **Toolbar.** The Toolbar provides quick access to commonly-used functions.

◆   **Image Viewer**. The Image Viewer is used to display images of vehicles photographed by the VRS imaging units.

◆   **Traffic History Log**. The Traffic History Log contains information on each vehicle photographed by the VRS imaging units, including the plate number and time of vehicle entry.

◆   **Event Log**. The Event Log contains SeeWay event records.

2.2.1.1   Toolbar

The Toolbar provides quick access to commonly-used SeeWay functions. A depiction of the toolbar appears in Figure 4 below.

Figure 4: Live Tab Toolbar

The table below describes each button and its functionality:

Button	Function	Description
	Settings	Provides access to the Settings window.
	Live Video	Provides access to the Live Video window.
	Clear List	Clears the Traffic History Log.
	Split Viewer	Splits the viewer in order to display images from all the cameras simultaneously. Enabled if two or more cameras are deployed.
	Help	Provides access to on-line help.
	About	Displays the version number of SeeWay and the recognition package

Table 2: General Tab Toolbar Buttons

2.2.1.2   Image Viewer

The Image Viewer is used to display one or more images of the vehicle currently selected in the Traffic History Log. The view has one or more tabs – one for each camera. The camera's ID appears in the tab, while the image of the vehicle captured by the camera is displayed in the tab's viewer.

The following information appears in the black background at the bottom of the viewer:

Parameter	Description
Exposure	The camera's shutter speed, in microseconds
Gain	The camera's gain setting (0 = minimum, 255 = maximum)
Iris	The degree of the iris aperture opening (0 = fully open, 255 = fully closed)
Sensor	The sensor type used – color, black/white or automatic

Table 3: Image Viewer Camera Settings

2.2.1.2.1 Split Viewer

When more than one camera is deployed, you can use the **Split Viewer** button (see Table 2) to split the viewer window into multiple, simultaneous views. To expand one of the views, double click on it.
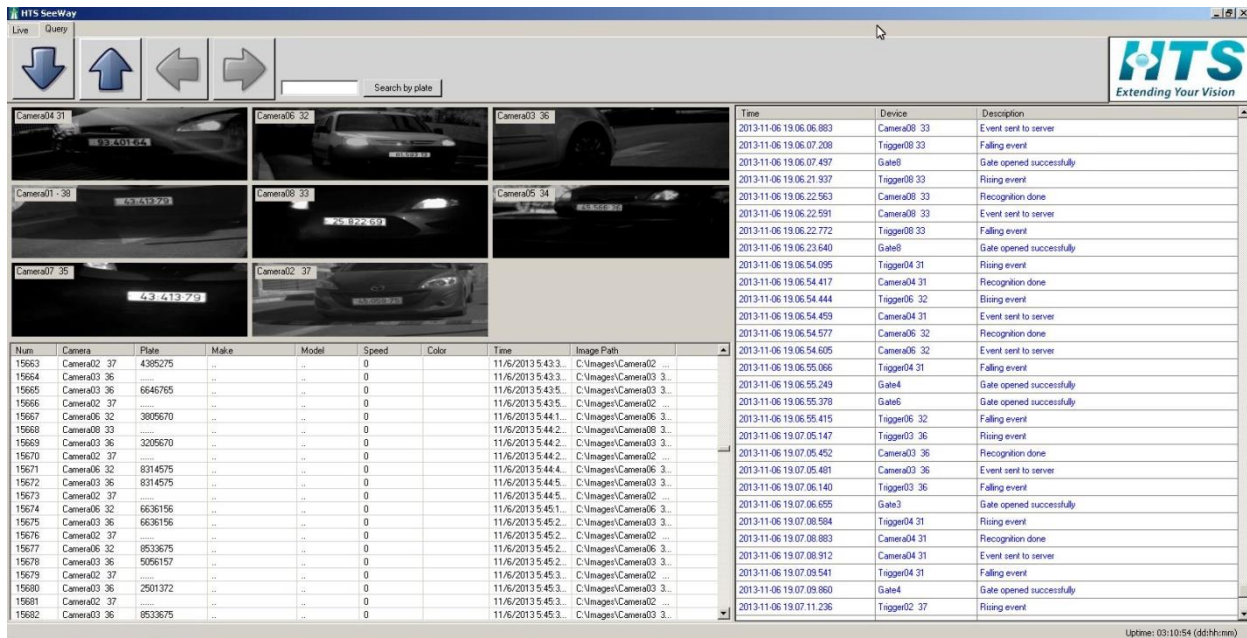
Figure 5: Split Viewer

2.2.1.3 Traffic History Log

The Traffic History Log is a list of records containing information that is captured as the vehicle enters the SeeWay system. The following information can be stored in the log (note that some of the fields may not be available, depending on the system configuration):

Parameter	Description
Number	Vehicle entry serial number, used to establish the order of entry
Camera	Camera ID
Plate	License plate number
Make	Vehicle manufacturer
Model	Vehicle model name
Speed	Speed of vehicle at the time of detection
Color	Vehicle color
Time	Detection timestamp
Image Path	Path to the location of the image file

Table 4: Traffic History Log Fields

2.2.1.4   Event Log

The Event Log contains a list of SeeWay system events. For each event, the following information is displayed:

♦ **Time**. An event timestamp.

♦ **Device**. The name of the device that recorded the event.

♦ **Description.** A textual description of the event.

Records of system failures or events that may affect system operation are displayed in *red*.

2.2.2   Query Tab

The Query tabbed sub-window is divided into the following sections:

♦ **Toolbar.** The Toolbar allows for navigation between images.
♦ **Image Viewer**. The Image Viewer is used to display images of vehicles photographed by the VRS imaging units.

2.2.2.1   Toolbar

The Toolbar helps navigate between SeeWay images. Up to 10 images can be captured per vehicle. A depiction of the toolbar appears in Figure 6 below.

Figure 6: Query Tab Toolbar

The table below describes each button and its functionality:
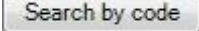
Button	Function	Description
⬇	Next Vehicle	Displays the image(s) for the next vehicle in the traffic history log.
⬆	Previous Vehicle	Displays the image(s) for the previous vehicle in the traffic history log.
➡	Next Image	Displays the next image in the vehicle's image set.
⬅	Previous Image	Displays the previous image in the vehicle's image set.
Search by code	Search by code	Searches for image(s) by plate number. You can use any portion of the plate number to search. *Wild card* characters ("*" and "?") can also be used in the search string.

Table 5: View Tab Toolbar Buttons

2.2.2.2   Image Viewer

The Image Viewer displays one or more images of the vehicle currently selected in the Traffic History Log.

Chapter 3
Quick Start

This chapter provides step-by-step instructions on how to ready SeeWay for operational use.

NOTE

Do not perform any operations other than the ones specified here without consulting with your HTS representative.

➔   **To prepare the SeeWay system for operation:**

1. Configure the parameters in the General Settings window.

2. Open the Cameras window and perform discovery of the camera units in the network. Choose the cameras to allocate to the lane controller, and give each camera a meaningful name.

3. Open the External I/O Devices window and choose the external I/O device to be used. Give the device a meaningful name.

4. Add triggers (either a hardware I/O device or VMD) using the Trigger Settings window. Choose whether to trigger on a *rising* (front of vehicle) event or *falling* (rear of vehicle) event.

5. Open the Camera Settings window and check **to one** of the following trigger boxes:

   a. **H/W Trigger** box if a hardware trigger is to be used.

   b. VMD trigger box if a VMD trigger is to be used.

6. If a gate is deployed, open the Gates window, add a gate, and give it a meaningful name.

7. Open the Camera Settings window, and set the camera type to one of the following:

   a. Recognition (LPR)

   b. Overview (no recognition)

   c. VIR (make/model) – when the VIR feature is supported by the license (HASP)

8. If the **Camera Type** is *not* set to "Overview", and if the illumination used is white, open the Capture Set window, and set the **Camera Light** to "Color".

Chapter 4
Settings Window

The Settings Window is used to configure various aspects of the SeeWay system:

- ♦ General Settings

- ♦ Devices (Cameras, I/O Devices, Gates, Triggers)

- ♦ Archiving Settings

- ♦ Communications Settings

- ♦ Monitoring Settings

To display the Settings window, click on the **Settings** button.

The Settings window is displayed. The Settings window features a navigation tree used to access specific configuration pages. A sample navigation tree appears in Figure 7 below.
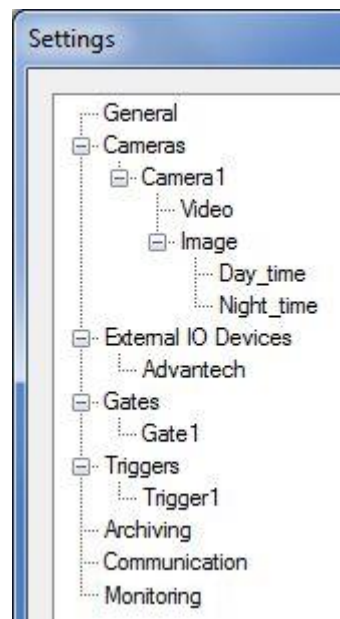
Figure 7: Settings Window Navigation Tree

Click on one of the tree's nodes in order to access the required configuration page.

NOTE

When defining devices, the order of definition is important. Devices should be defined in the following order:
1) Camera
2) I/O devices (when required)
3) Gates

4.1   General Settings

The General Settings window allows you to configure a variety of system functions. The window appears as shown in Figure 8 below.

Figure 8: General Settings Window

The following table contains detailed information on each of the fields appearing in the window.

Parameter	Description	Default value
General		
Draw VMD Polygons	If checked – the VMD (Video Motion Detection) Area of Interest (AOI) is drawn on the images in the images view.	Not Checked
Controller Name	ID for connectivity of the SeeWay application to the SeeControl management system (read only).	Actual computer name
System Units	Metric or Imperial	Metric
TV System	NTSC or PAL	PAL
Time of day to invoke cleaning	The time at which the daily cleaning task is performed.	3:03:03 AM
Close Live Video and Settings Window after	Closes the Live Video window and Settings window after a period of inactivity.	10 minutes
Camera Credentials		
User Name	The user name required to access and configure the cameras	admin
Password	The password required to access and configure the cameras	1234
Advanced Parameters – recommended for HTS use only (select the check box to display)		
Perform Video Decoding on	Type of processor used for video decoding: • Automatic – SeeWay automatically determines whether to use software or graphics processing • Software • Graphics	Automatic
Run the Video Decoders on	The number of software threads to be allocated to the video decoders	4
Number of Cores for Recognition	The number of CPU cores to be allocated for recognition activity	2
I/O (Alarm) Mechanism	The mechanism use for alarm notification: • Pushing • Polling	Pushing
Triggers Priority	Determines how to prioritize the trigger events in the buffer • Priority by trigger time – process the oldest trigger in the buffer (FIFO) • Priority by camera – process a different camera's trigger each time (round robin)	Priority by trigger time
Load application in simulation mode	If checked – the application is initiated in simulation mode.	Not checked
Simulation videos folder	Choose the path to the directory containing the simulation videos when there is use in simulation instead of use of real cameras. Choose the ellipsis [⋯] to select the directory from a folder-navigation dialog box.	Blank

Table 6: General Settings

4.2   Cameras Window

The Cameras Window allows you to discover IP cameras and allocate them for use in SeeWay. The window appears as shown in Figure 9 below.

Figure 9: Cameras Window

The following table contains detailed information on each of the fields appearing in the window.

Parameter	Description
Unassigned Cameras	
Unassigned Cameras	List of IDs of discovered cameras that have not yet been assigned. The field appearing below contains the IP address of a selected camera. Click on **Discover** to establish a list of unassigned cameras.
Manual	When checked, cameras are assigned by manually entering their IP address. After entering the IP address, click **Add** (*and not* **Discover**!!) to assign the camera.
Assigned Cameras	
Assigned Cameras	List of IDs of assigned cameras. The field appearing below contains the IP address of a selected camera. Click on **Remove** to de-assign a camera from the Assigned Cameras list.

Table 7: Cameras Window Parameters

4.2.1   Camera (Imaging Unit) Settings

The following types of imaging Units are used in the VRS:

Imaging Unit Type	Shutter Type	Lens Type
N50	CMOS (rolling, line-by-line shutter). Requires constant illumination	Embedded Varifocal lens (9-22 mm), software configured
SCH200	CCD (instantaneous). Illumination can be synched to the image capture.	External Fixed lens (8 mm, 12 mm, 16 mm, 25 mm, 50 mm), manually configured

NOTE

Not all of the fields in the settings windows are relevant to all cameras. When configuring settings for a specific camera, the fields that are irrelevant to the camera will be *grayed out*.

The Camera Settings window is used to configure the cameras defined in the SeeWay system. The window appears as shown in Figure 10 below.
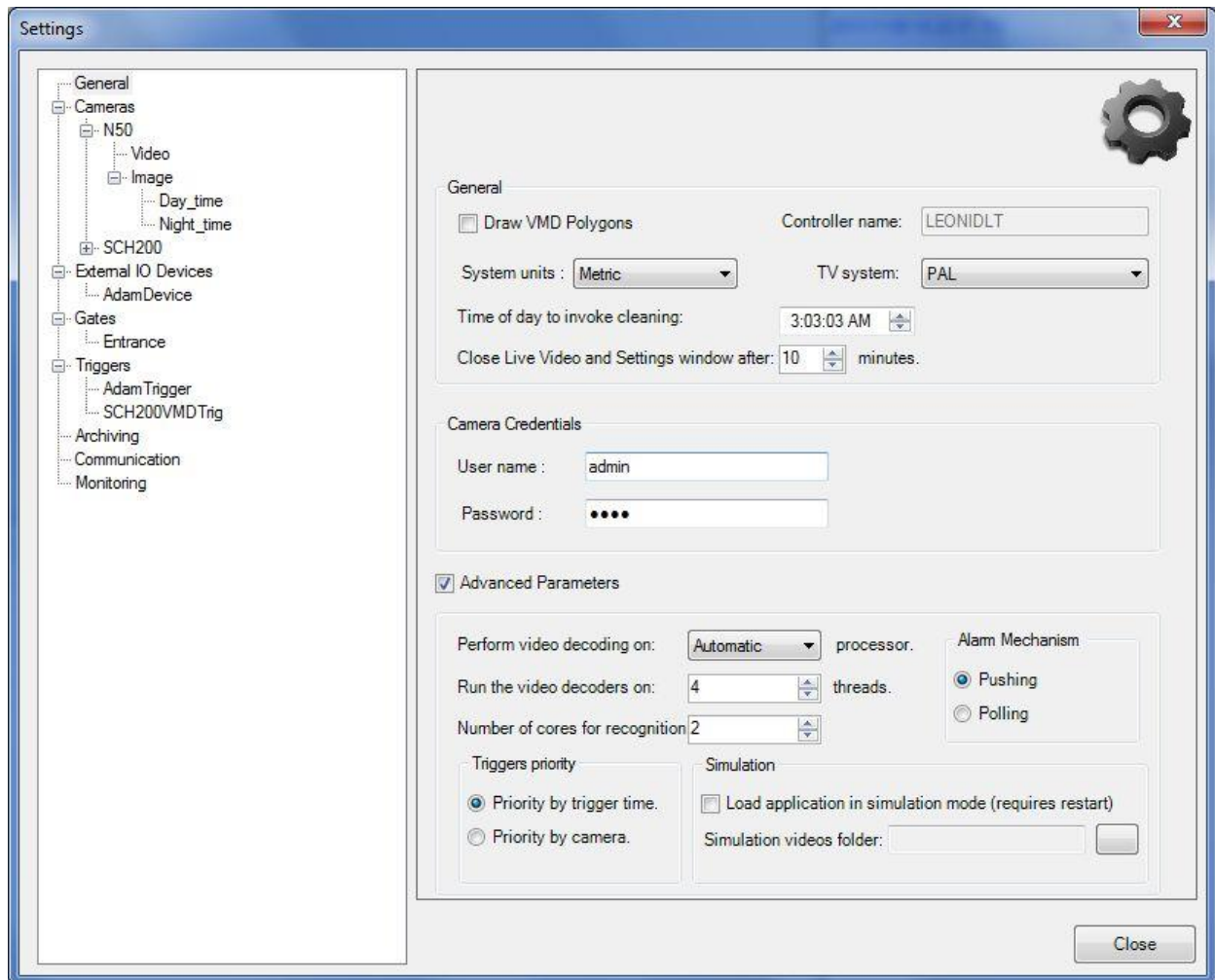

Figure 10: Camera Settings Window

The following table contains detailed information on each of the fields appearing in the window.

Parameter	Description	Default Value
General		
Name	The camera name as generated in the Cameras sub-window. The name can be modified here.	
Camera Type	The type of camera employed: • Recognition (LPR) • Overview • VIR (make/model) – when the VIR feature is supported by the HASP installed	Recognition
Image Scale Factor	Used to shrink the picture to enhance sharpness Range: 1 – 5	1
Number of Captures	Defines the number of images to capture. Range: 1 – 10	3
Image Offset After Trigger	For use in overview mode only. In overview mode, only one image is captured. This field is used to set a capture delay following the trigger event.	0
Vehicles Moving Direction	The direction of the vehicle's movement relative as viewed from the camera: • Bottom to top • Top to bottom • Left to right • Right to left	Bottom to top
Triggers		
HW Trigger	Checked if a hardware trigger is to be used	Not checked
HW Trigger Name	The name of the hardware trigger	
VMD Trigger	Checked if a software (VMD) trigger is to be used	Not Checked
VMD Trigger Name	The name of the software trigger	
Car Speed (when the feature is supported by the license)		
Enabled	Checked if the vehicle's speed is to be measured	Not Checked
Lens Focal Length	Focal length of the lens, in millimeters	35
Camera Height from Ground	Height of the camera as installed, in meters or feet	5 (meters)
Normal Plate Height	The typical height of the license plate on the vehicle, in meters or feet	0.5 (meter)
Horizontal Distance to FOV	The width of the field-of-view, in meters or feet	15 (meters)
Information		
Camera IP	The IP address of the camera	
Firmware	The version of the firmware used in the camera	

Table 8: Camera Settings Window Parameters

4.2.1.1   Video Settings Window

The Video Settings window is used to configure the video capabilities of the cameras defined in the SeeWay system. The window appears as shown in Figure 11 below.
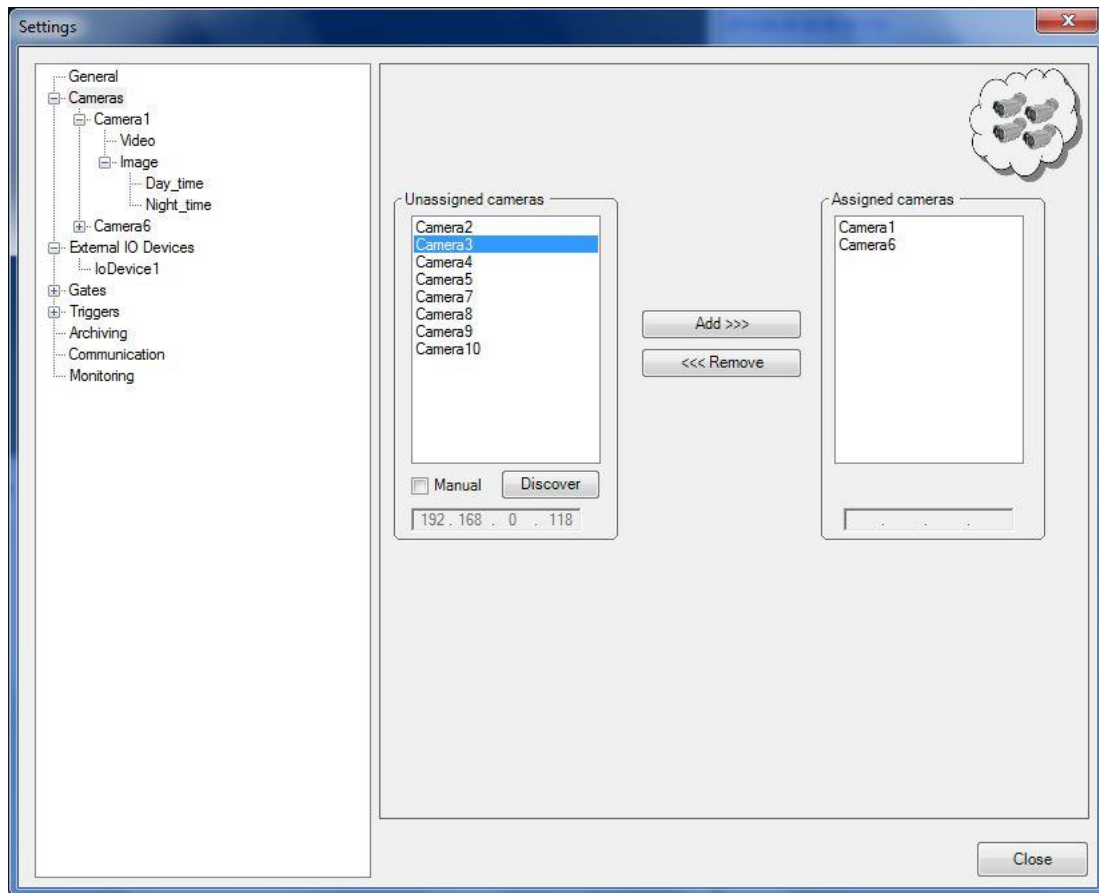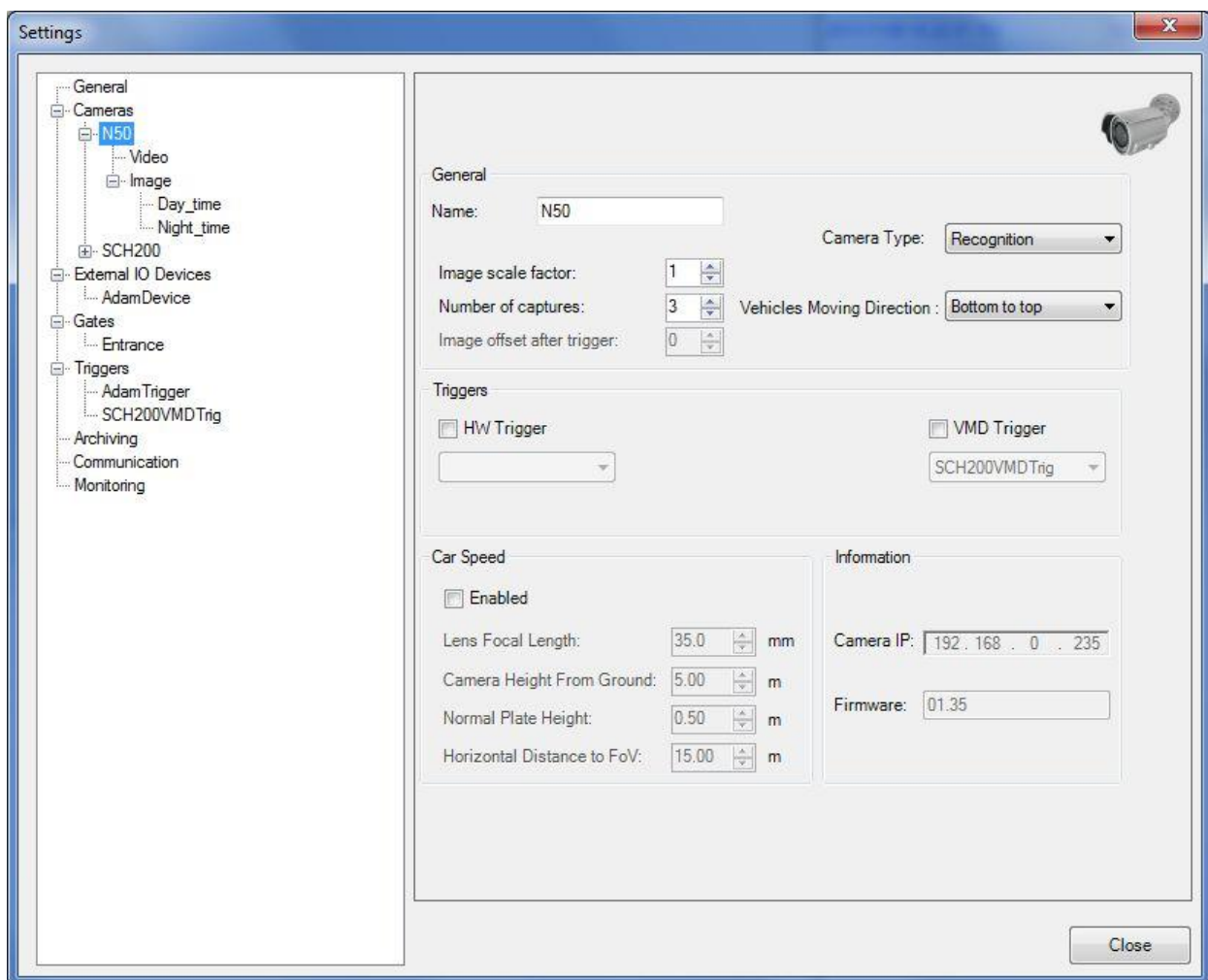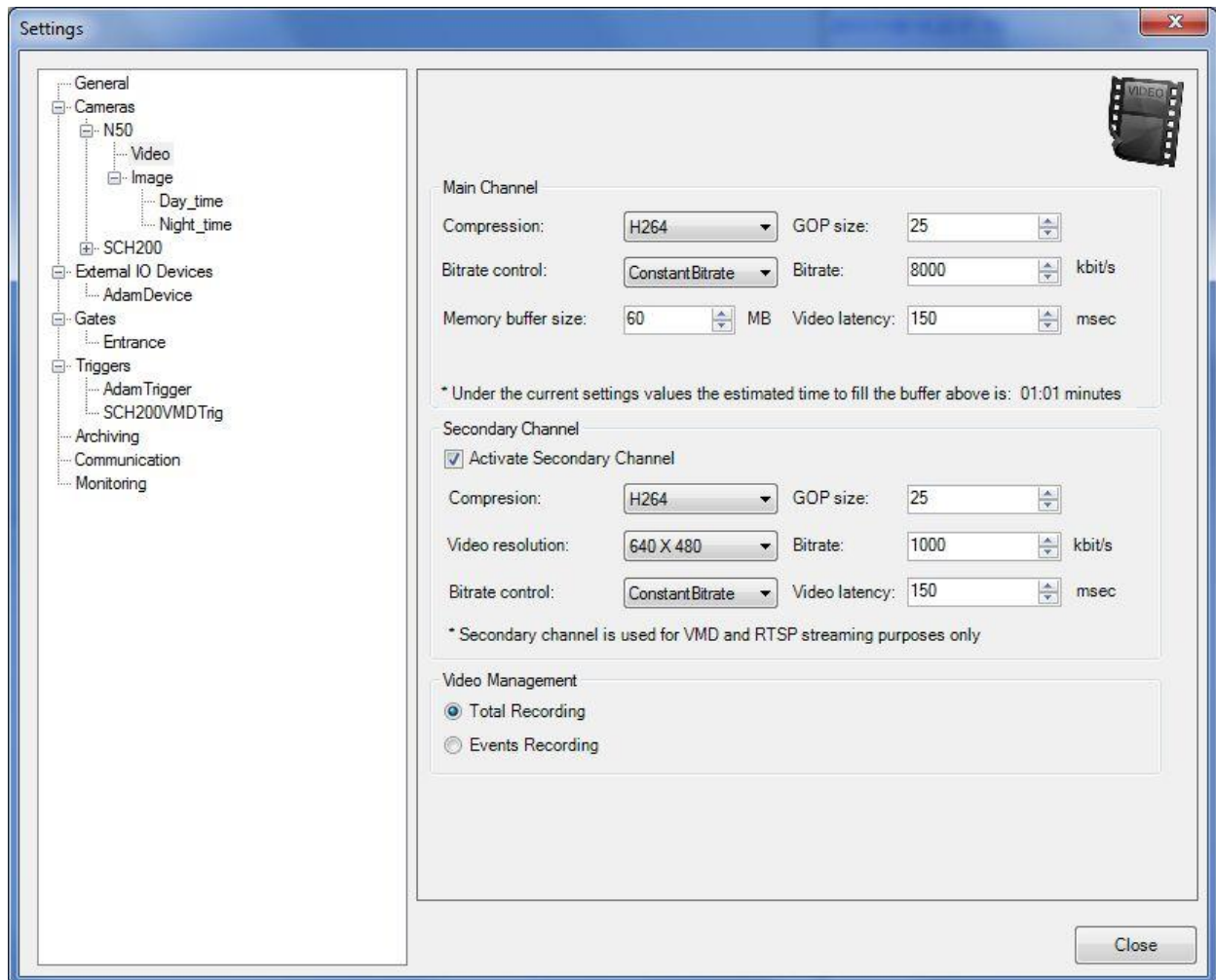

Figure 11: Video Settings Window

The following table contains detailed information on each of the fields appearing in the window.

Parameter	Description	Default Value
Main Channel		
Compression	Compression method: • H.264 • JPG • Raw (raw video data, not compressed)	H.264
GOP Size	MPEG GOP (Group of Pictures) size. Defines the number of frames in each picture group, which begins with an i-frame. GOP = number of b-frames + 1 (for the i-frame)	25
Bitrate Control	Constant Bitrate or Variable Bitrate	Constant Bitrate
Bitrate	Video bitrate in Kbps	8000
Memory Buffer Size	Size of memory buffer allocated for video, in megabytes	60
Video Latency	Latency of video stream in milliseconds	150
Buffer Capacity Estimate	Based on the parameters configured above, SeeWay calculates and displays the elapsed time during which the memory buffer is filled.	
Secondary Channel		
Activate Secondary Channel	If checked, a secondary channel is employed for VMD (Video Motion Detection) or RTSP (Real Time Streaming Protocol) streaming	Not checked
Compression	Compression method: • H.264 • JPG • Raw (raw video data, not compressed)	H.264
GOP Size	MPEG GOP (Group of Pictures) size. Defines the number of frames in each picture group, which begins with an i-frame. GOP = number of b-frames + 1 (for the i-frame)	25
Video resolution	Secondary channel frame size (Width x Height)	the minimal resolution supported by the camera
Bitrate Control	Constant Bitrate or Variable Bitrate	Constant bitrate
Bitrate	Video bitrate in Kbps	1000
Video Latency	Latency of video stream in milliseconds	150
Video Management		
Video Management	Video recording method: • Total Recording – constant video recording • Events Recording – recording during triggered events only	Total Recording

Table 9: Video Settings Window Parameters

4.2.1.2   Camera Image Window

The Camera Image window is used to configure the image capture settings for a specific camera.

There are 3 options for configuring capture settings:

♦   SeeWay-Controlled Settings

♦   Camera-Controlled Settings (recommended for overview camera)

♦   Manual Settings

The first two options above make use of the AGE (Automatic Gain & Exposure) algorithm. For each event, the AGE algorithm dynamically calculates the required gain & exposure values needed in order to reach the intensity required to capture the plate image.

4.2.1.2.1   SeeWay-Controlled Settings

The window depicted in Figure 12 below displays SeeWay-Controlled Settings.

Figure 12: SeeWay-Controlled Image Settings Window

The following table contains detailed information on each of the fields appearing in the window for settings controlled by SeeWay-based algorithms.

Parameter	Description	Default Value
Gain & Exposure	If checked, the AGE (Automatic Gain & Exposure) algorithm is employed. • Controlled by SeeWay – AGE (Automatic Gain & Exposure) algorithms settings are automatically invoked by SeeWay • Controlled by Camera – AGE (Automatic Gain & Exposure) settings are automatically invoked by the camera. • Manual – Image settings are configured manually	For Recognition Camera: Controlled by SeeWay For Overview Camera: Controlled by Camera
Automatic Image Settings		
Initial Gain	The initial gain value for the algorithm. Range: camera-defined minimum to 255	N50: 2 SCH200: 62
Min Gain	Minimum allowed gain value the system can set in the AGE function. Range: camera-defined minimum to 255	N50: 2 SCH200: 62
Max Gain	Maximum allowed gain value the system can set in the AGE function. Range: camera-defined minimum to 255	N50: 40 SCH200: 100
Initial Exposure	The Initial exposure value for AGE-based automatic shutter control Range: camera-defined minimum to 4000 micro seconds	N50: 1000 SCH200: 330
Min Exposure	Minimum exposure speed allowed for AGE-based automatic shutter control. Range: camera-defined minimum to 4000 micro seconds	N50: 62 SCH200: 50
Max Exposure	Maximum exposure speed allowed for AGE-based automatic shutter control. Range: camera-defined minimum to 4000 micro seconds	N50: 2000 SCH200: 500
No Car Timeout	Execute the algorithm on the whole image after this time interval (in seconds). Range: 0 to 3600	120
No Recognition Limit	After this number of cars without recognition the Auto Gain & Exposure settings are reset to their initial values. Range: 0 to 1000	20
History	Sets a moving average to determine the influence of previous images on the current calculation. If the parameter = N, the influence of current image is 1/N. Range: 0 to 1000	10
Operations		
Defaults	Press the **Defaults** button to restore all settings to their default values.	
Add Capture Set	Press the **Add Capture Set** button to save the settings. The application saves the settings in a capture set under an automatically-generated name.	

Table 10: Image Settings Window Parameters

4.2.1.2.2   Camera-Controlled Settings

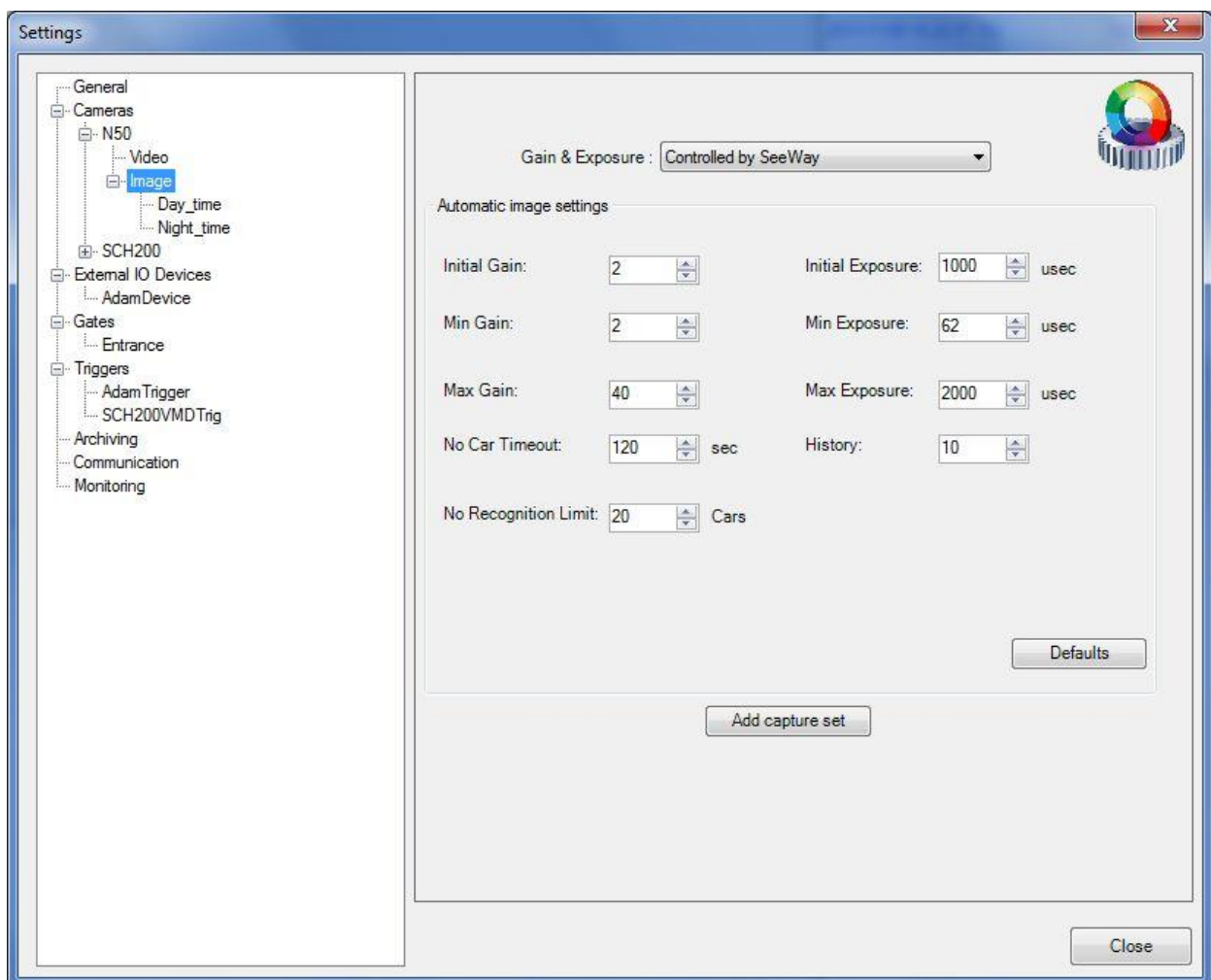The window depicted in Figure 13 below displays Camera-Controlled Settings.

Figure 13: Camera-Controlled Image Settings Window

The following table contains detailed information on each of the fields appearing in the window for settings controlled by camera-based algorithms (For N50 there are no algorithmic limits).

Parameter	Description	Default Value
Gain & Exposure	If checked, the AGE (Automatic Gain & Exposure) algorithm is employed. • Controlled by SeeWay – AGE (Automatic Gain & Exposure) algorithms settings are automatically invoked by SeeWay • Controlled by Camera – AGE (Automatic Gain & Exposure) settings are automatically invoked by the camera. • Manual – Image settings are configured manually	
Limits		
Gain Limit	Sets the maximum gain permitted by the system, in dB.	SCH200: 28 dB
Exposure Limit	Sets the maximum exposure permitted by the system, in micro-seconds.	SCH200: 6250

Table 11: Image Settings Window Parameters

4.2.1.3   Capture Set Window

The Capture set window is used to activate and modify a capture set. The window appears as shown in Figure 14 below.

Figure 14: Capture Set Settings Window

The following table contains detailed information on each of the fields appearing in the window.

Parameter	Description	Default value
Name	The name of the capture set. The name can be modified here.	Day_Time – capture set for day time (6AM-6PM) Night_Time – capture set for night time (6PM-6AM)
Enable Set	Check to activate the capture set	Checked
Set will be activated at	The time at which the capture set is to be activated	6:00:00 AM for day time 6:00:00 PM for night time
Image Settings		
Brightness	Brightness level (0 = lowest, 255 = highest)	127
Contrast	Contrast level (0 = lowest, 255 = highest)	127

Parameter	Description	Default value
Iris State	The degree of the iris aperture opening (0 = fully open, 255 = fully closed)	0
Gamma	Gamma correction value (0 = minimum, 255 = maximum)	N50 Recognition camera: 115 N50 Overview camera: 255 SCH200 Recognition camera: 85 SCH200 Overview camera: 170
Gain	The camera's gain setting (camera-defined) (0 = minimum, 255 = maximum)	N50: 2 SCH200: 62
Exposure	The camera's shutter speed, in microseconds	500
Camera Light	The camera illumination type: • Color – for cameras with white illumination • BW (black/white) – for yellow illumination, or for cameras employing a lens with an IR filter • Automatic – for cameras employing an automatic IR Cut filter	Recognition camera: BW Overview camera: Automatic
Auto Gain Exposure Enhancements		
Change Iris State while running auto gain exposure	If checked, the iris state can be changed when running AGE.	Not checked
Minimum Iris State	Specifies the minimum degree of the iris aperture opening (0 = fully open, 255 = fully closed)	0
Maximum Iris State	Specifies the maximum degree of the iris aperture opening (0 = fully open, 255 = fully closed)	255
Target Intensity		
Plate	Controls the target intensity of the plate section of the image (0 = minimum, 255 = maximum)	100
Image	Controls the target intensity of the entire image (0 = minimum, 255 = maximum)	100
Operations		
Defaults	Press the **Defaults** button to restore all image settings to their default values.	
Delete Capture Set	Press the **Delete Capture Set** button to remove the capture set from the system memory.	

Table 12: Capture Set Settings Window Parameters

4.3   External I/O Devices Window

The External I/O Devices window allows you to manage the I/O devices defined in the SeeWay system. The window appears as shown in Figure 15 below.
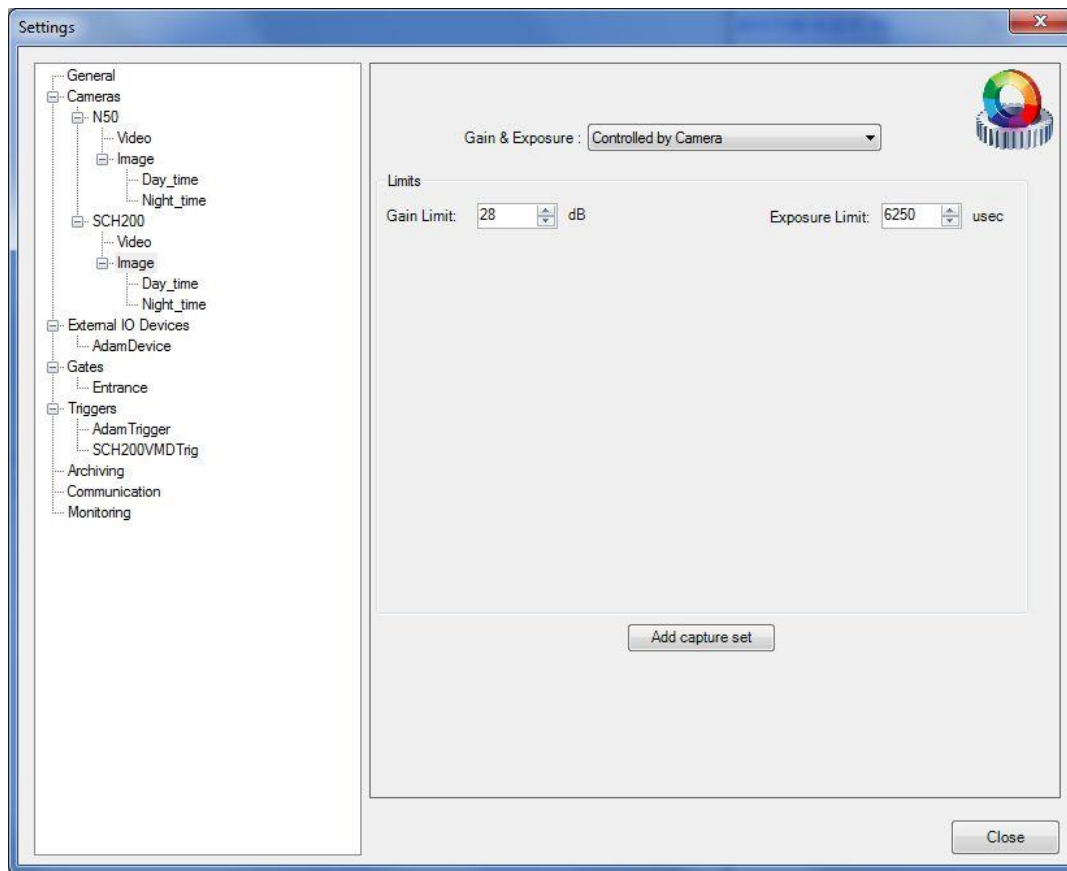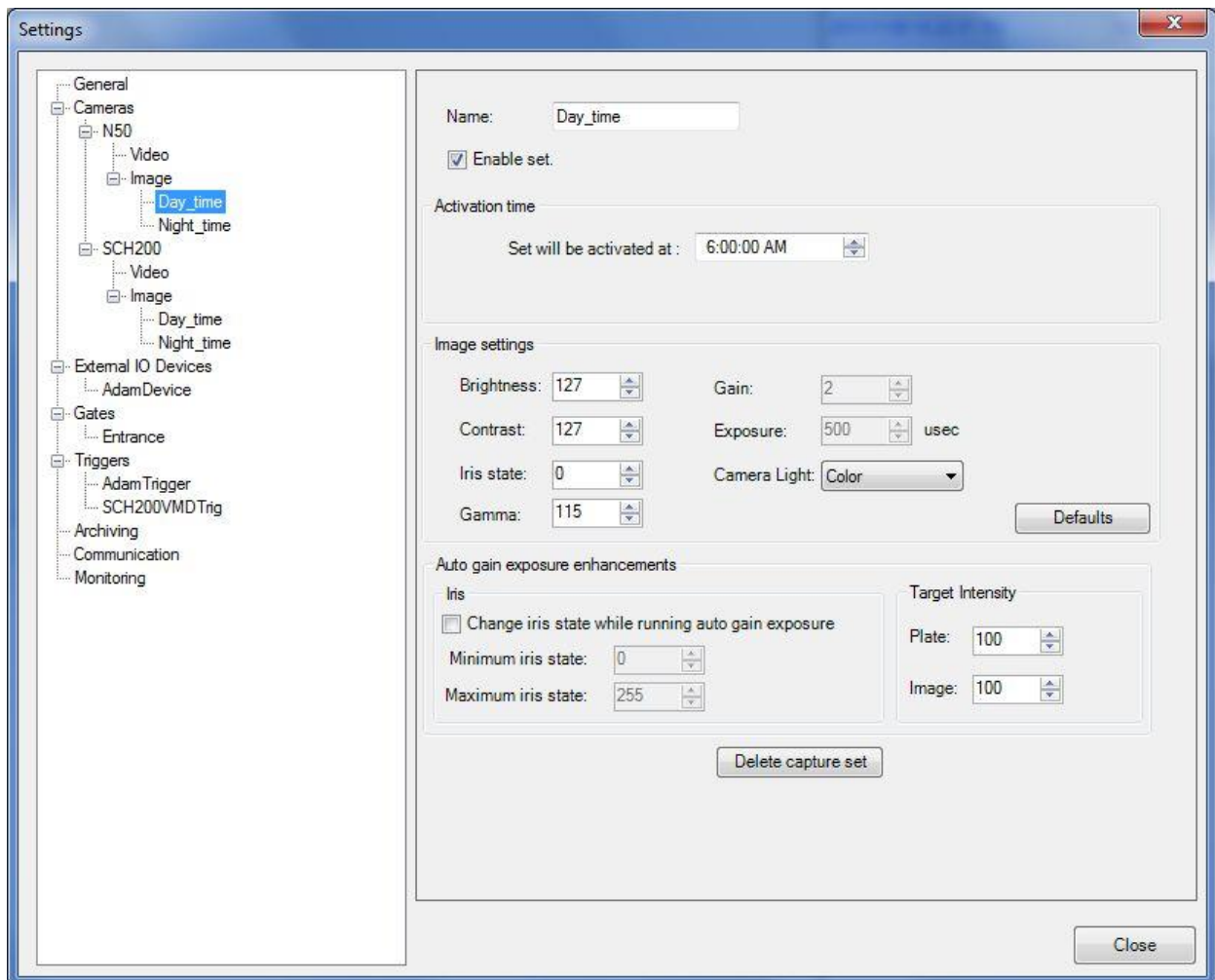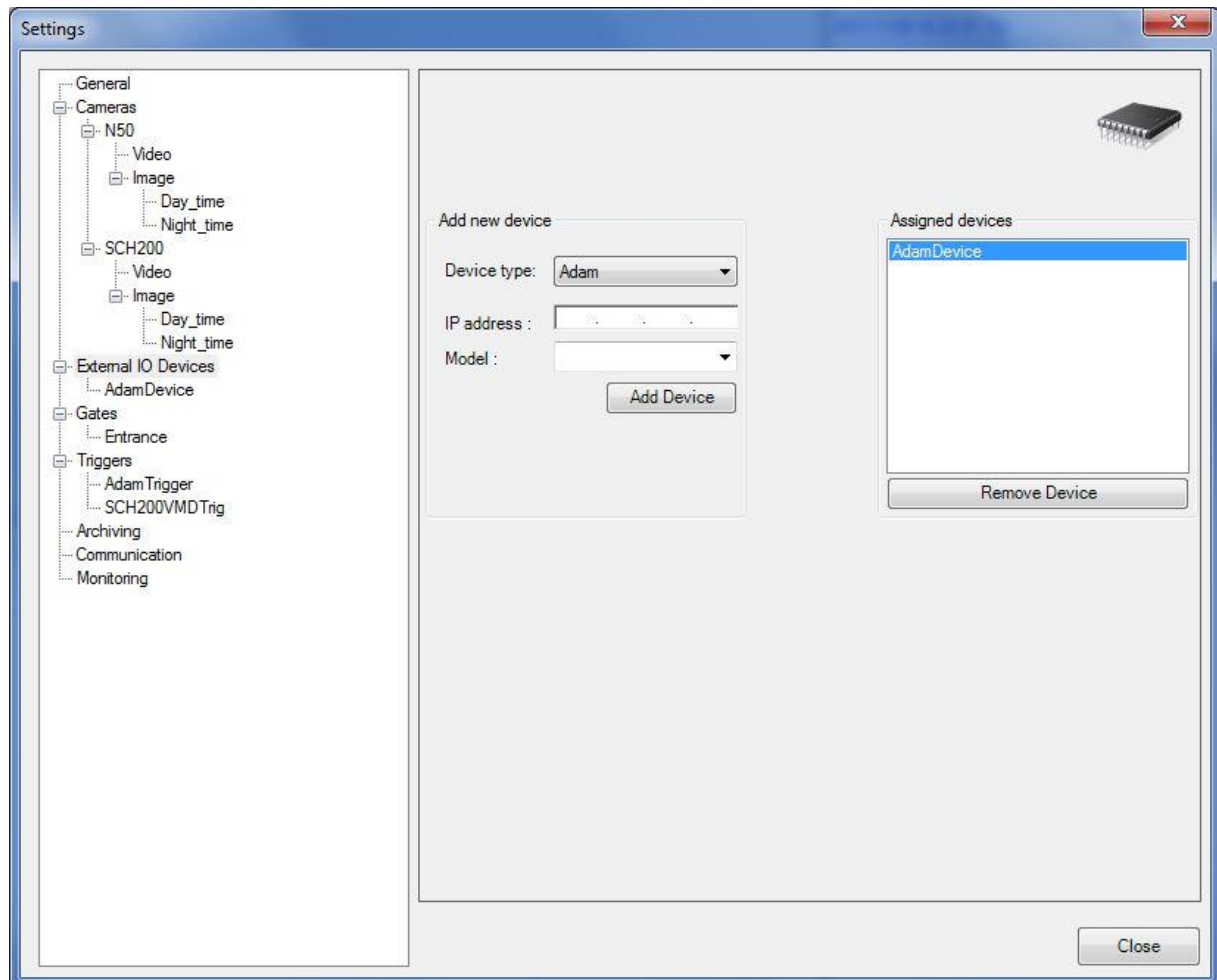

Figure 15: External I/O Device Settings Window

The following table contains detailed information on each of the fields appearing in the window.

Parameter	Description
Device Type	Contains a list of all the supported external I/O device types. Once a device type has been selected and an IP address has been entered, press the **Add Device** button to create an instance of the device. An automatically-generated device name appears in the **Assigned Devices** list.
IP Address	The IP address of the external I/O device (relevant only for devices with an IP address).
Model	The model number of the device specified in **Device Type.**
Assigned Devices	Contains a list of all defined devices. In order to remove a device from the list, select it and press the **Remove Device** button.

Table 13: External I/O Device Settings Window Parameters

4.3.1   I/O Device Settings Window

The I/O Device Settings window allows you to modify the configuration of I/O devices defined in the SeeWay system. The window appears as shown in Figure 16 below.

Figure 16: I/O Device Settings Window

The following table contains detailed information on each of the fields appearing in the window.

Parameter	Description
General	
Name	The I/O device name
IP Address	The IP address of the external I/O device (relevant only for devices with an IP address).
Model	The model number of the device specified in the **Name** field.

Table 14: I/O Device Settings Window Parameters

4.4   Gates Window

The Gates window allows you to manage the gates defined in the SeeWay system. The window appears as shown in Figure 19 below.

Figure 17: Gates Window

The following table contains detailed information on each of the fields appearing in the window.

Parameter	Description
Controlling Device	Contains a list of all the supported controlling devices. Once a device has been selected and a pin number has been entered, you can press the **Add Gate** button to create an instance of the gate. An automatically-generated device name appears in the assigned gates list.
Pin Number	The pin number of the controlling device
Assigned Gates	Contains a list of all assigned gates. In order to remove a gate from the list, select it and press the **Remove Gate** button.

Table 15: Gates Window Parameters – Gates Tab

4.4.1   Gate Settings Window

The Gate Settings window allows you to modify the configuration of gates defined in the SeeWay system. The window appears as shown in Figure 18 below.
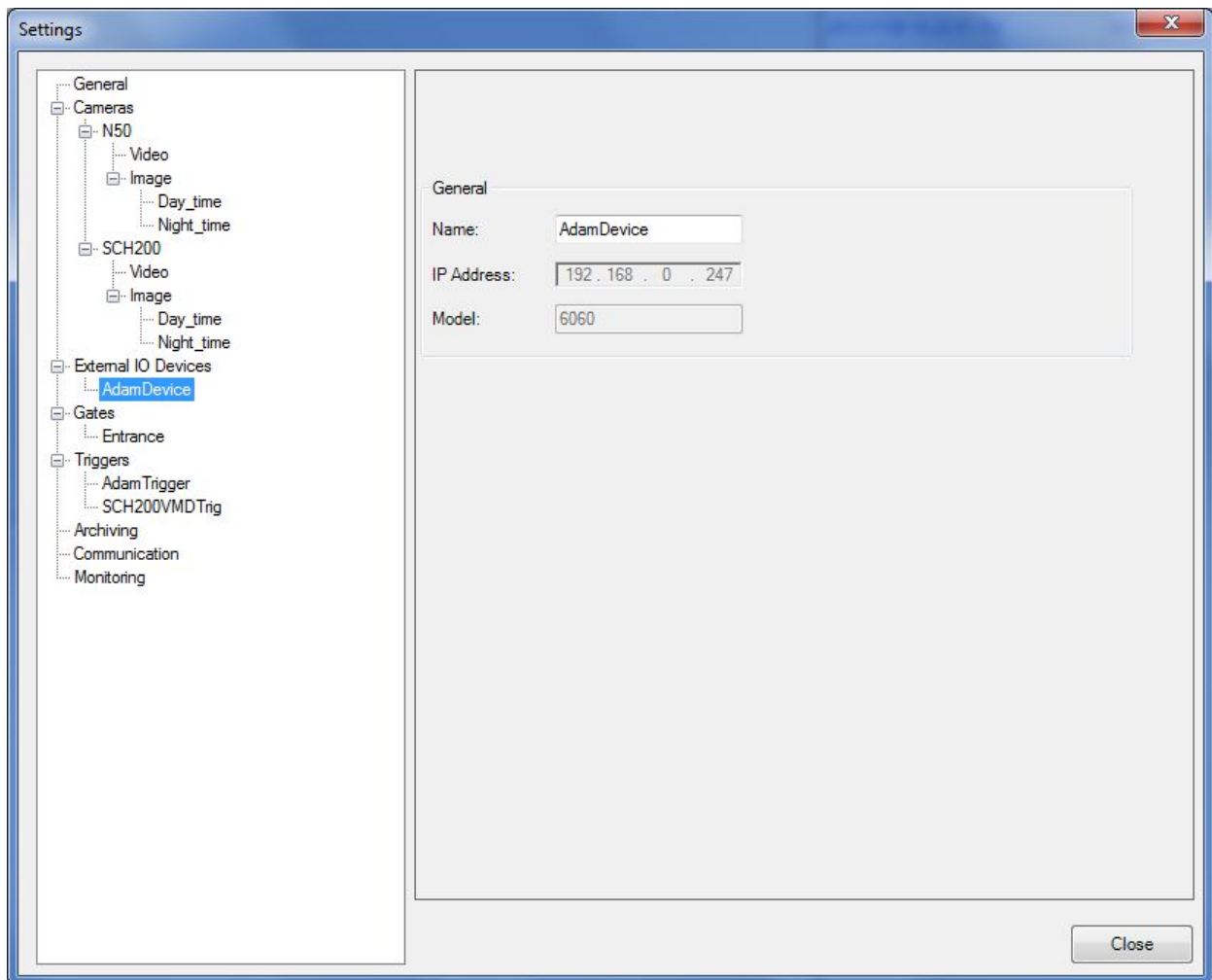

Figure 18: Gate Settings Window

The following table contains detailed information on each of the fields appearing in the window.

Parameter	Description
General	
Name	The name of the gate
Controlling Device	The name of the controlling device
Connected Pin	The I/O port ID of the controlling device connected to the gate
Gate	
Pulse Length	The duration of the pulse sent to open the gate, in milliseconds
Normally Open/Closed	Select Normally Open or Normally Closed according to the device specification.

Table 16: Gate Settings Window Parameters

4.5   Triggers Settings

The Triggers Settings window allows you to designate a camera or I/O device as a trigger. The section appears as shown in Figure 19 below.
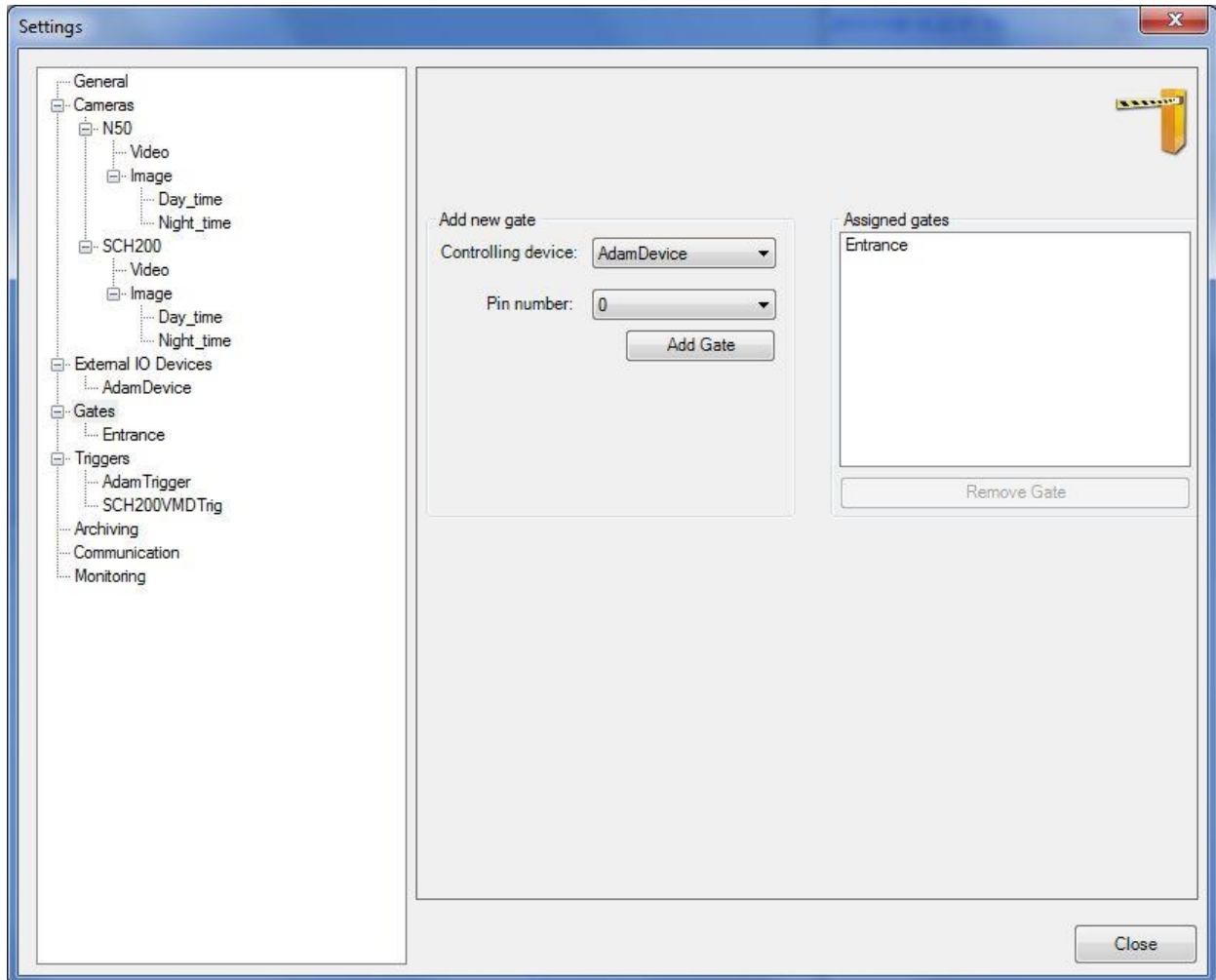

Figure 19: Device Settings Window – Trigger Section

The following table contains detailed information on each of the fields appearing in the window.

Parameter	Description
Device	Contains a list of all the devices that perform I/O operations, in other words: • Cameras • I/O devices Once a device has been selected, you can press the **Add Trigger** button to use the device as a trigger. An automatically-generated trigger name appears in the **Current Triggers** list.
Defined Triggers	Contains a list of all defined triggers. In order to remove a trigger from the list, select it and press the **Remove Trigger** button.
Related Device	The name of the device (if VMD detection is used, the name of the camera)
Trigger Type	VMD (software) or HW (hardware)

Table 17: Device Settings Window Parameters – Trigger Section

4.5.1   Hardware Trigger Settings

The Hardware Trigger Settings window allows you to configure a hardware-based trigger device. The window appears as shown in Figure 20 below.
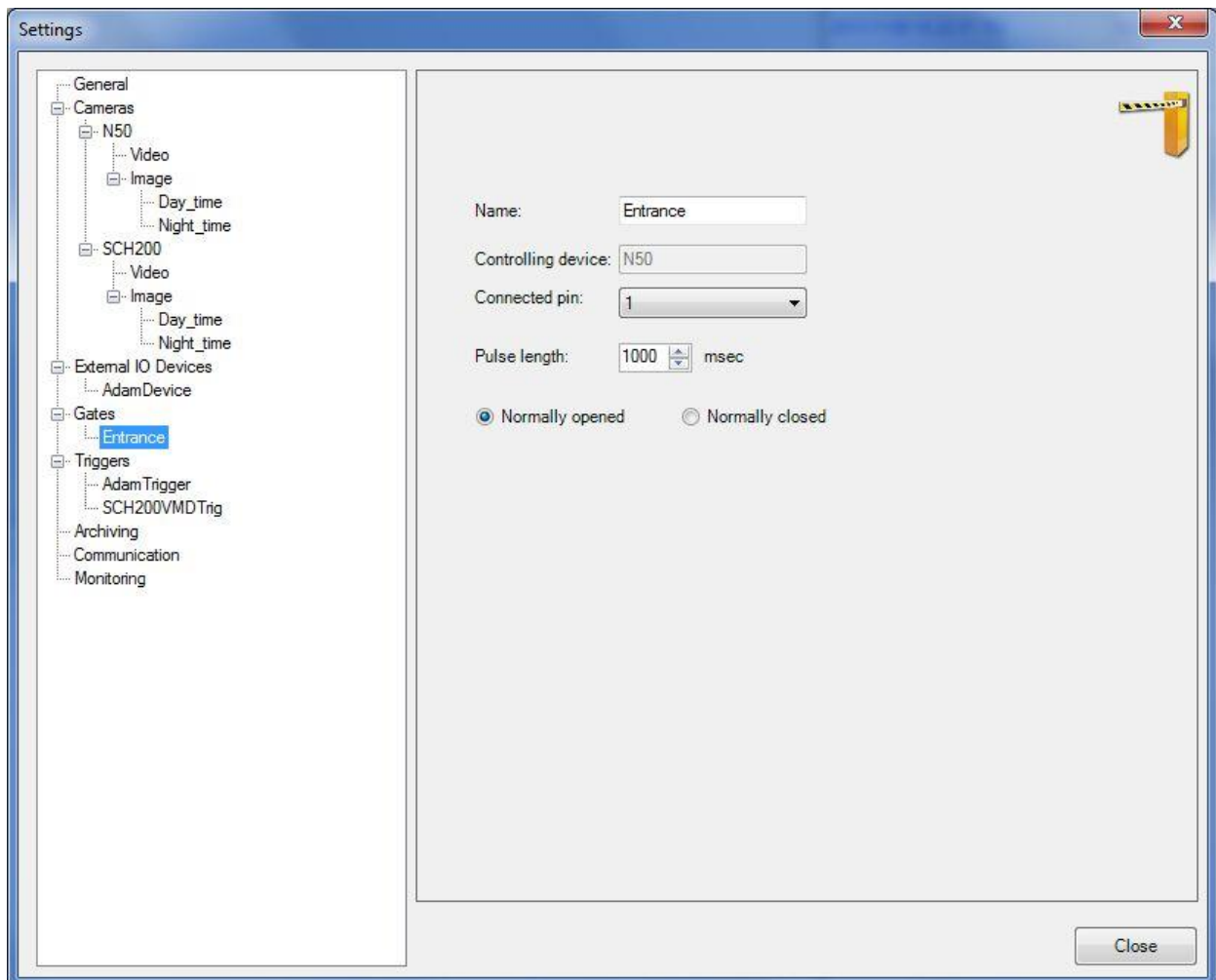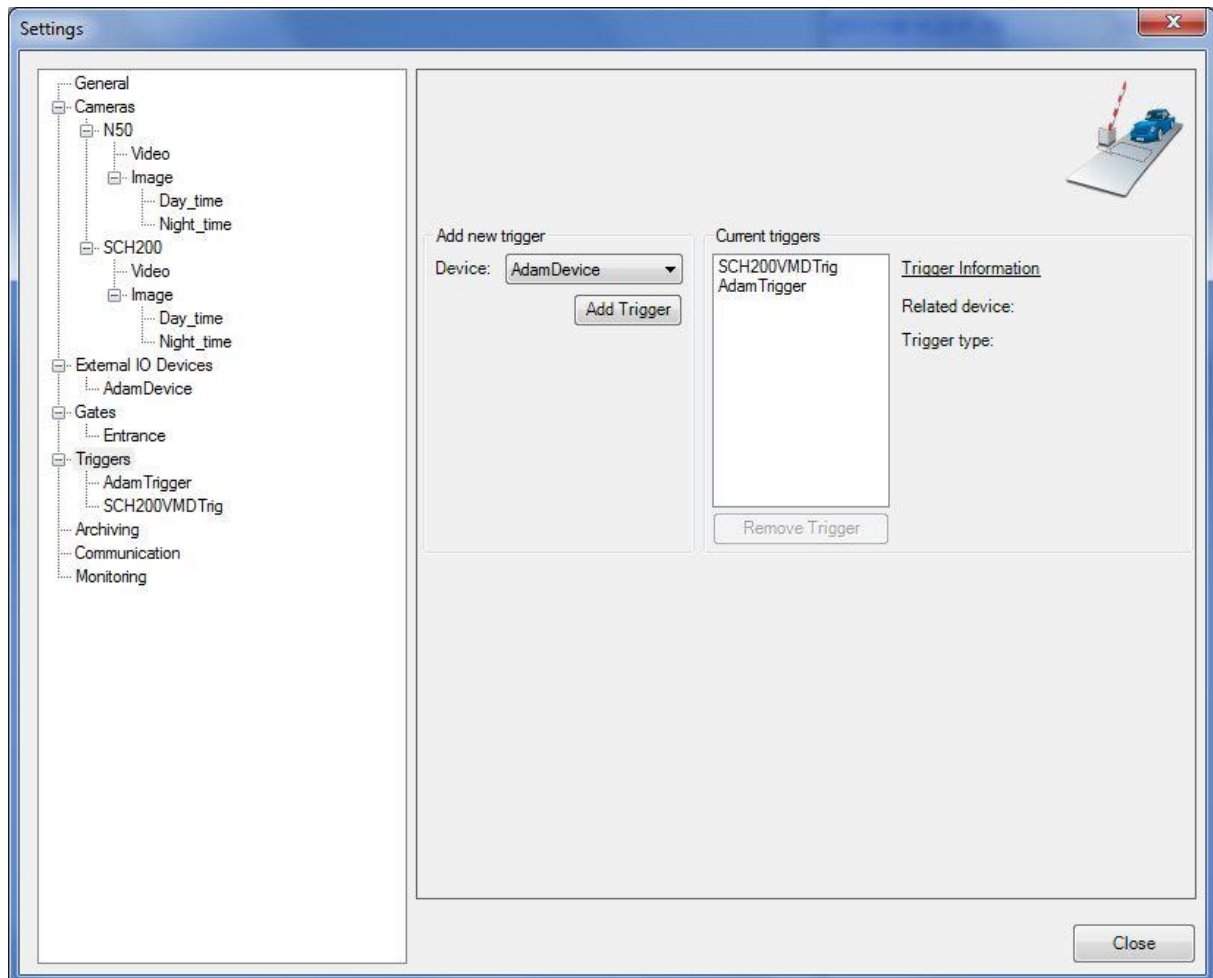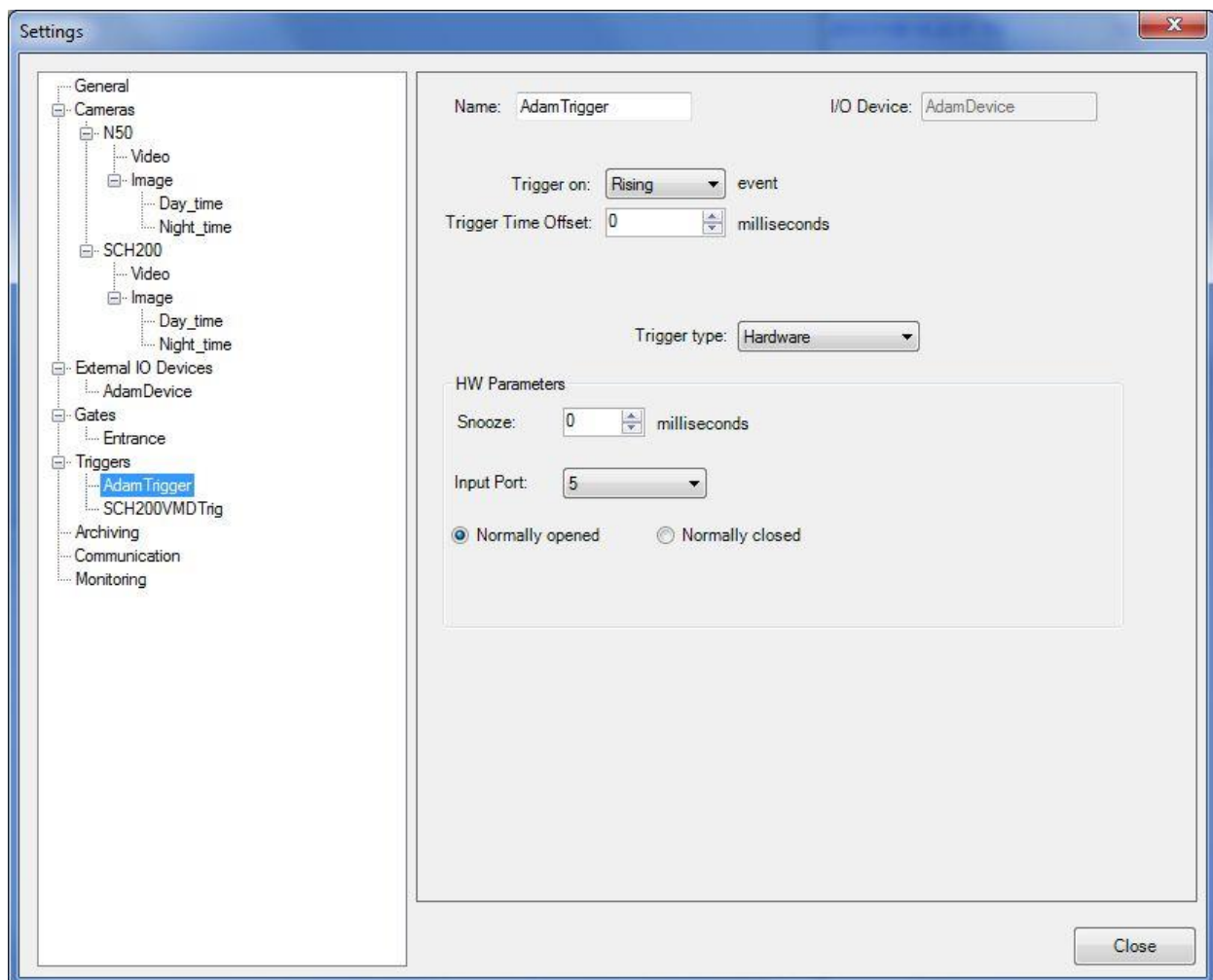

Figure 20: Hardware Trigger Settings Window

The following table contains detailed information on each of the fields appearing in the window.

Parameter	Description	Default Value
Name	The name of the trigger. The trigger name can be modified here.	
I/O Device	The name of the I/O device associated with the trigger	
Trigger on	• Rising - Initiates recognition when the trigger event rises • Falling - Initiates recognition when the trigger event falls	Rising
Trigger Delay	Defines the time in milliseconds between the moment that the vehicle enters the trigger point, and the moment that the application receives the trigger signal. According to the value selected, the application will use images captured "x" milliseconds before receiving the trigger signal. This entry is critical for identification of fast moving vehicles in case a slow detector has been deployed. Range: -60000 to +2000 milliseconds. The default value is 0, which is best suited for a fast detector. Negative numbers are used to specify a capture AFTER the trigger.	0 for external I/O device or VMD 150 for camera I/O
Trigger Type	Radio buttons specifying the trigger type: • Hardware • VMD (Software – Video Motion Detection). For VMD triggers, refer to the <u>VMD (Software) Trigger Settings</u> section.	Hardware
HW Parameters		
Snooze	Trigger events rise and fall within a given period of time, either due to a vehicle entry, or to system "noise". The **Snooze** field contains a minimum period of time that a vehicle-generated rise and fall should take. Any period of time that is shorter than the defined time should be considered as noise-generated, and should be ignored. Note: If the **Trigger on** "falling" is specified, the event will be delayed for the duration specified in the snooze field.	0
Input Port	The input port in the I/O card connected to the laser or loop trigger.	0
Normally Open/ Normally Closed	This radio button option must be coordinated with the hardware device settings. Please refer to the hardware device's user manual (for technicians).	Normally Open

Table 18: Hardware Trigger Settings Window Parameters

4.5.2 VMD (Software) Trigger Settings

The VMD Trigger Settings window allows you to configure a software-based, Vehicle Motion Detection (VMD) trigger device. The window appears as shown in Figure 20 below.

Figure 21: VMD Trigger Settings Window

The following table contains detailed information on each of the fields appearing in the window.

Parameter	Description	Default Value
Name	See the explanation in Table 18.	
I/O Device	See the explanation in Table 18.	
Trigger on	See the explanation in Table 18.	
Trigger Delay	See the explanation in Table 18.	
Trigger Type	See the explanation in Table 18.	
VMD Parameters		
Minimum On Frames	The minimum number of trigger frames required to confirm that a vehicle has entered the field-of-view. Range: 1 to 10	1
Maximum Off Frames	The maximum number of frames without a trigger required to confirm that a vehicle has exited the field-of-view. Range: 0 to 10	0
Input Channel	• Main Stream • Secondary Stream (available only if configured in the Video Settings window)	Main Stream
VMD Sensitivity	• Very High • High • Normal • Low • Very Low	Normal

Table 19: VMD Trigger Settings Window Parameters

4.6   Archiving Settings

The Archiving Settings window allows you to control the storage of camera-generated still images and videos. The window appears as shown in Figure 22 below.
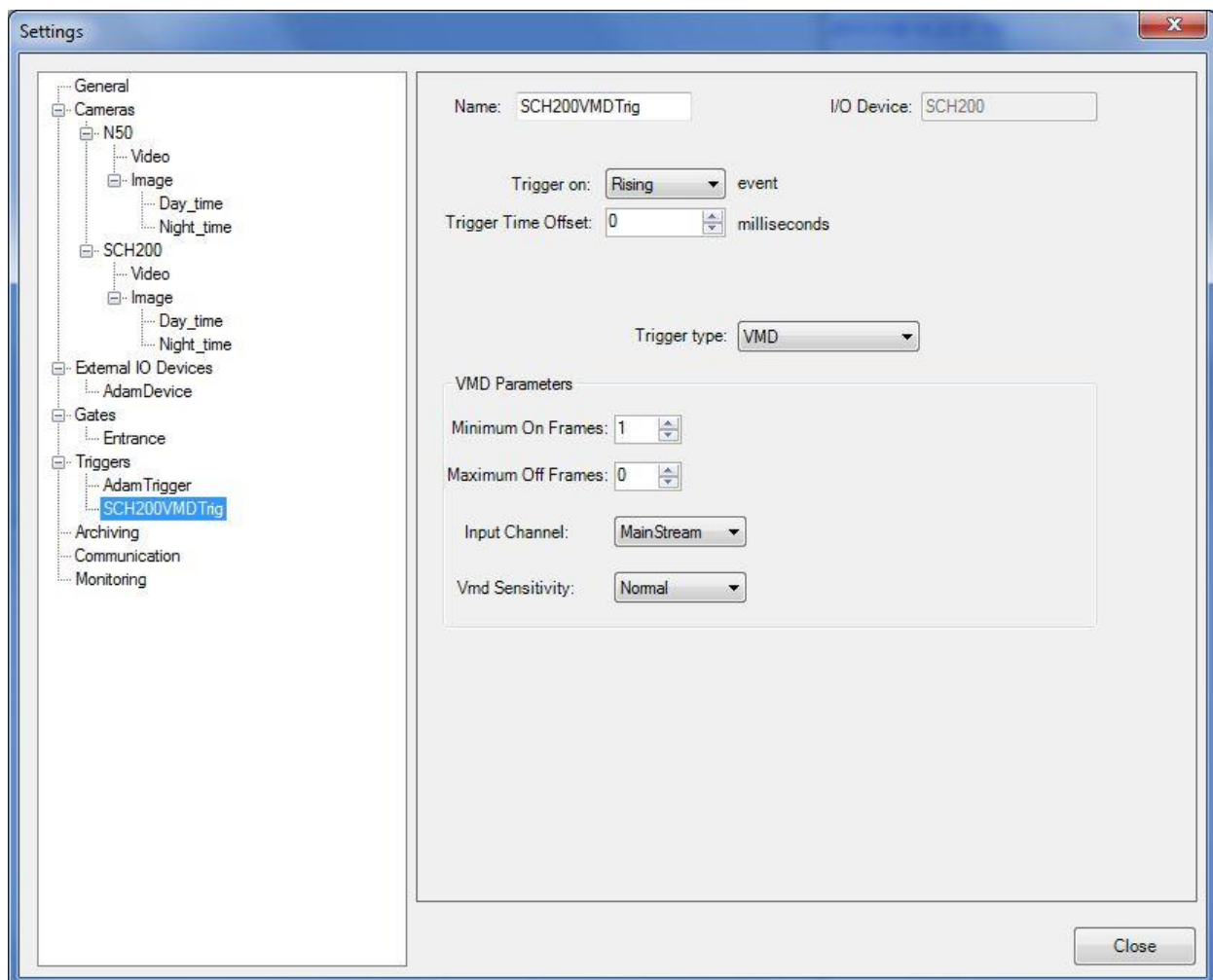

Figure 22: Archiving Settings Window

The following table contains detailed information on each of the fields appearing in the window.

Parameter	Description	Default Value
Images		
Save all Images	If selected, all intermediate images are saved (as defined in the capture sets).	Not checked
Save best image	If selected, only the best image is saved.	Checked
Resize Images	If checked, all images are resized according to the parameters specified in the **Resize Options** box.	Checked
Maintain Aspect Ratio	If checked, the original aspect ratio (height:width) is preserved upon resizing.	Checked
Height	The resize height expressed as a percentage of the original height	50%

Parameter	Description	Default Value
Width	The resize width expressed as a percentage of the original width	50%
Image Type		
JPEG or Bitmap	Radio buttons specifying the image compression type: • JPEG (compressed) • Bitmap (not compressed)	JPEG
JPEG Quality	The quality of the compressed JPEG image. Higher quality images achieve better clarity, but their files are larger and use more storage space. Typical sizes: 12KB for low and 40 KB for Medium. The available options: • Lowest (highest compression level, smallest size) • Low • Medium (recommended) • High • Highest (lowest compression level, largest size)	Medium
Plate Images		
Save Plate Images	If checked, images of the plates are saved.	Checked
JPEG or Bitmap	Radio buttons specifying the image compression type: • JPEG (compressed) • Bitmap (not compressed)	JPEG
JPEG Quality	The quality of the compressed JPEG image. Higher quality images achieve better clarity, but their files are larger and use more storage space. Typical sizes: 12KB for low and 40 KB for Medium. The available options: • Lowest (highest compression level) • Low • Medium • High • Highest (lowest compression level)	Highest
Image Storage		
Retention time	The number of days for which the image is stored.	14
Index images by	Stored images can be indexed by: • Hour (Recommended) • Day • Week • Month	Hour
Save in Directory	The path to the directory used to store images. Use the ellipsis [···] to select the directory from a folder-navigation dialog box.	C:\Images
Advanced Parameters (select the check box to display)		
Save video and triggers on disk	If checked, videos and triggers are saved on the VRS Controller's system disk.	Not Checked
Save in Directory	The path to the directory used to store videos and triggers. Use the ellipsis [···] to select the directory from a folder-navigation dialog box.	C:\Videos
Retention time	The period of time during which the videos and triggers are stored (hours).	3

Table 20: Archiving Settings Window Parameters

4.7 Communications Settings

The Communications Settings window allows you to control connectivity with the SeeControl server. The window appears as shown in Figure 23 below.
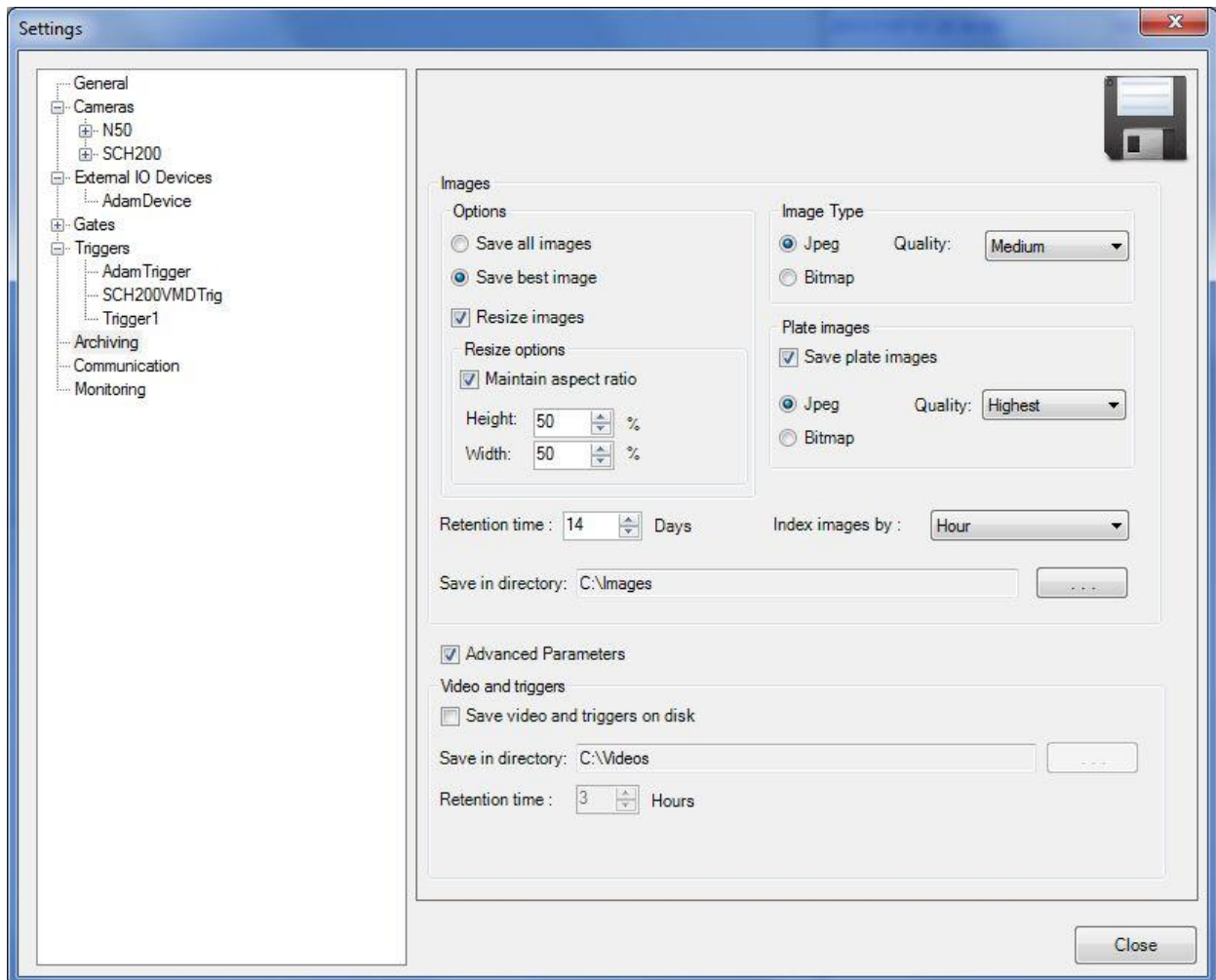

Figure 23: Communications Settings

The following table contains detailed information on each of the fields appearing in the window.

Parameter	Description
Server	
Enable communication with SeeControl	If checked, allows SeeWay to communicate with the SeeControl management system.
SeeControl Address	The IP Address of the SeeControl server
Username	The username required to access the SeeControl server
Password	The password required to access the SeeControl server
Message Queue	Refers to files intended for transfer to SeeControl. In case of loss of connectivity with SeeControl, these files awaiting transfer are stored by SeeWay until connectivity is restored. This parameter controls the period of time during which the files are stored. At the end of this period, the files are deleted, regardless of whether or not the transfer took place.
Local	
Local IP Address	The IP Address of the hardware platform running SeeWay.

Table 21: Communication Parameters

4.8 Monitoring Settings

The Monitoring Settings window allows you to control event-generating thresholds. The window appears as shown in Figure 24 below.

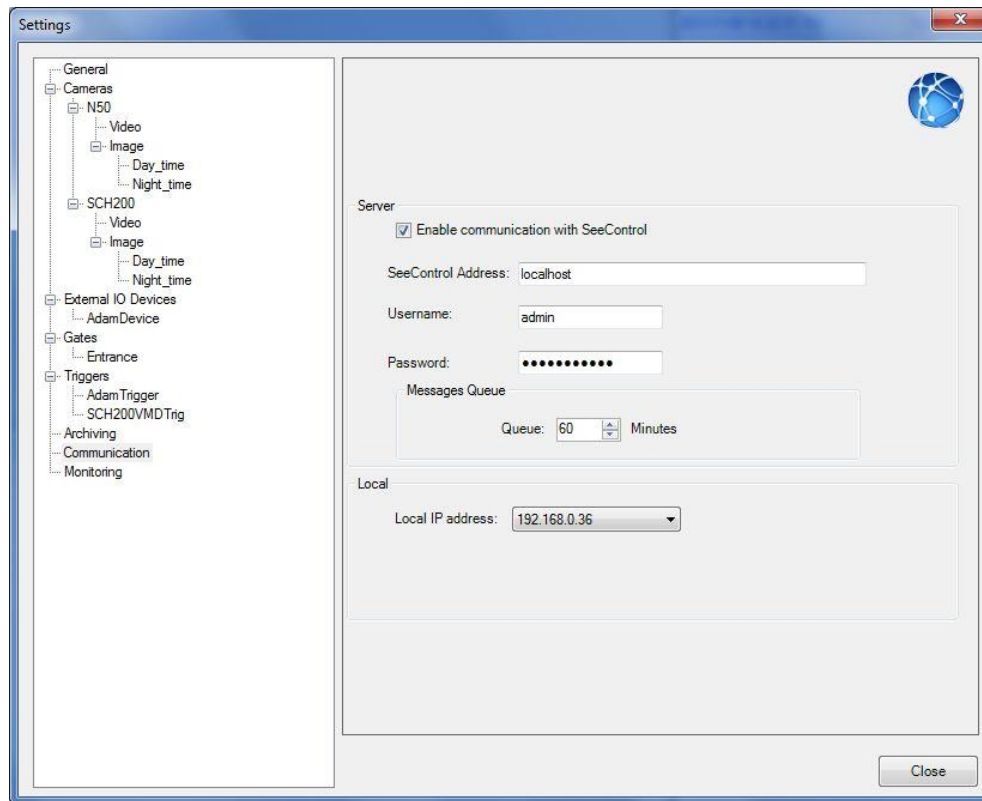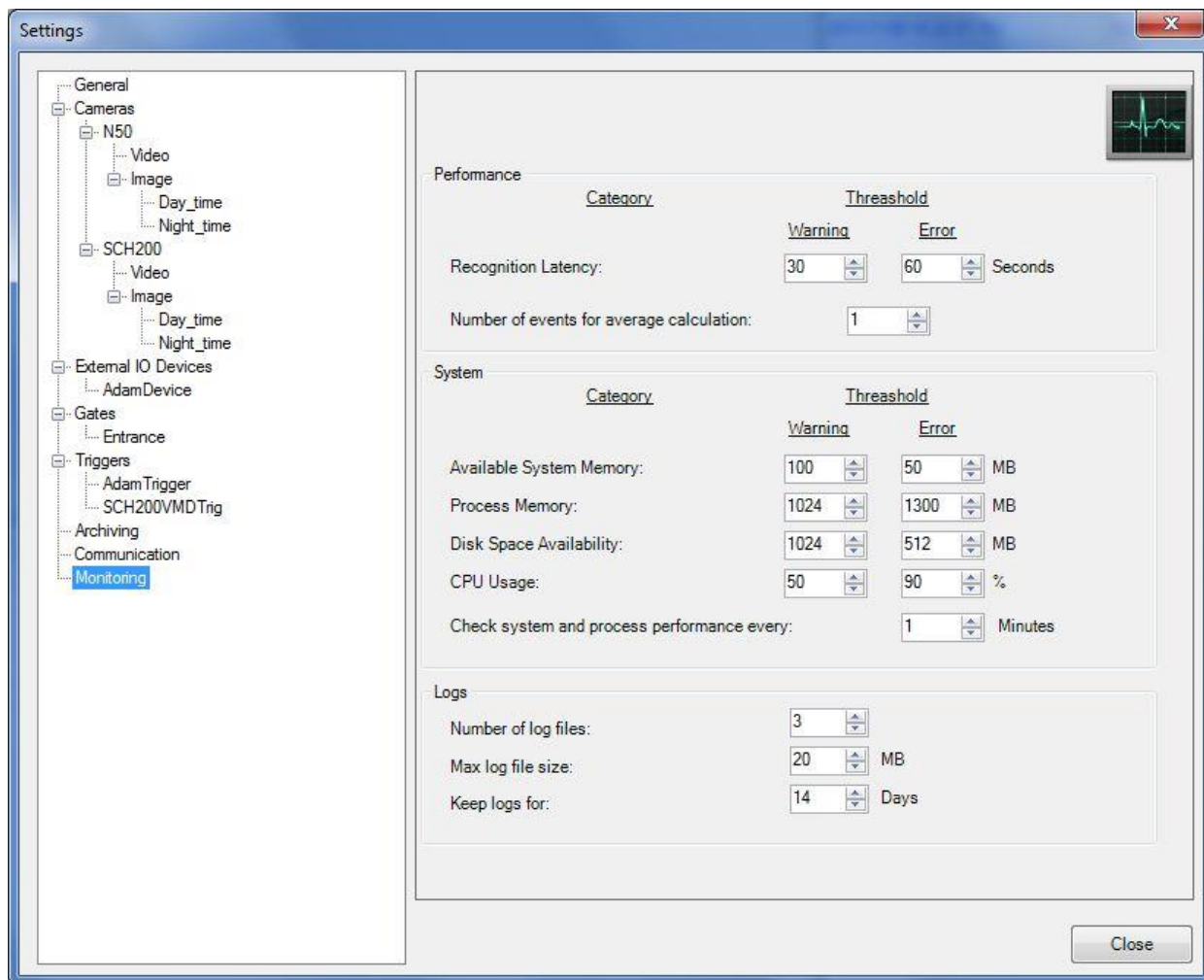**Figure 24: Monitoring Settings Window**

The following table contains detailed information on each of the fields appearing in the window.

Parameter	Description	Default Value
Performance Thresholds		
Recognition Latency Warning (seconds)	Defines a warning threshold for plate recognition delay. If the delay in plate recognition rises above the specified threshold, the application writes a warning message on the system's event log. When the delay in plate recognition drops below the specified threshold, the application will generate an information message that cancels the warning.	30
Recognition Latency Error (seconds)	Defines an error alert threshold for plate recognition delay. If the delay in plate recognition rises above the specified threshold, the application writes an error alert message on the system's event log. When the delay in plate recognition drops below the specified threshold, the application will generate an information message that cancels the error alert.	60
Number of Events for Average Calculation	Number of events used for calculation of averages for comparison with the thresholds	1
System Thresholds		
Available System Memory Warning (Mbytes)	Defines a warning threshold for available free RAM memory in the PC. If the amount of free memory drops below the specified threshold, the application writes a warning message on the system's event Log. When the amount of free memory rises above the specified threshold, the application will generate an information message that cancels the warning.	100
Available System Memory Error (Mbytes)	Defines an error alert threshold for available free RAM memory in the PC. If the amount of free memory drops below the specified threshold, the application writes an error message on the system's event Log. When the amount of free memory rises above the specified threshold, the application will generate an information message that cancels the error alert.	50
Process Memory Warning (Mbytes)	Defines a warning threshold for memory use by the application process. If the amount of memory used rises above the specified threshold, the application writes a warning message on the system's event log. When the amount of memory used drops below the specified threshold, the application will generate an information message that cancels the warning.	1024
Process Memory Error (Mbytes)	Defines an error alert threshold for memory use by the application process. If the amount of memory used rises above the specified threshold, the application writes an error alert message on the system's event log. When the amount of memory used drops below the specified threshold, the application will generate an information message that cancels the error alert.	1300
Disk Space Availability Warning (Mbytes)	Defines a warning threshold for available free disk space in the PC. If the amount of free disk space drops below the specified threshold, the application writes a warning message on the system's event Log. When the amount of disk space rises above the specified threshold, the application will generate an information message that cancels the warning.	1024

Parameter	Description	Default Value
Disk Space Availability Error (Mbytes)	Defines an error alert threshold for available free disk space in the PC. If the amount of free disk space drops below the specified threshold, the application writes an error message on the system's event Log. When the amount of disk space rises above the specified threshold, the application will generate an information message that cancels the error alert.	512
CPU Usage Warning	Defines a warning threshold for CPU usage in the PC. If the CPU usage percentage rises above the specified threshold, the application writes a warning message on the system's event log. When the CPU usage percentage drops below the specified threshold, the application will generate an information message that cancels the warning.	50 %
CPU Usage Error	Defines an error alert threshold for CPU usage in the PC. If the CPU usage percentage rises above the specified threshold, the application writes an error alert message on the system's event log. When the CPU usage percentage drops below the specified threshold, the application will generate an information message that cancels the error alert.	90 %
Frequency		
Check system and process performance every	Sets the frequency of the above-defined diagnostics checks (in minutes).	1
Logs		
Number of Log Files	The number of log files to be stored by the system. When the maximum number of log files is reached, a new log file replaces the least-recently-written log file. Note: This parameter is relevant only to the current execution of the SeeWay application.	3
Maximum Log File Size (Mbytes)	The maximum log file size, in megabytes. When the maximum size is reached, the file is stored, and a new file is opened. Note: This parameter is relevant only to the current execution of the SeeWay application.	20
Keep Logs For (days)	The maximum number of days during which the log is stored on the system. Log files older than the maximum are deleted. Note: This parameter is relevant only to prior executions of the SeeWay application.	14

Table 22: Diagnostics Settings Window Parameters

Chapter 5
Live Video Window

The Live Video window is used to monitor traffic, providing you with an on-line video stream, sent directly from your VRS installation.

5.1   Live Video Viewer

The Live Video window (see Figure 25 below) contains one or more tabbed sub-windows, each serving as a real-time traffic viewer.
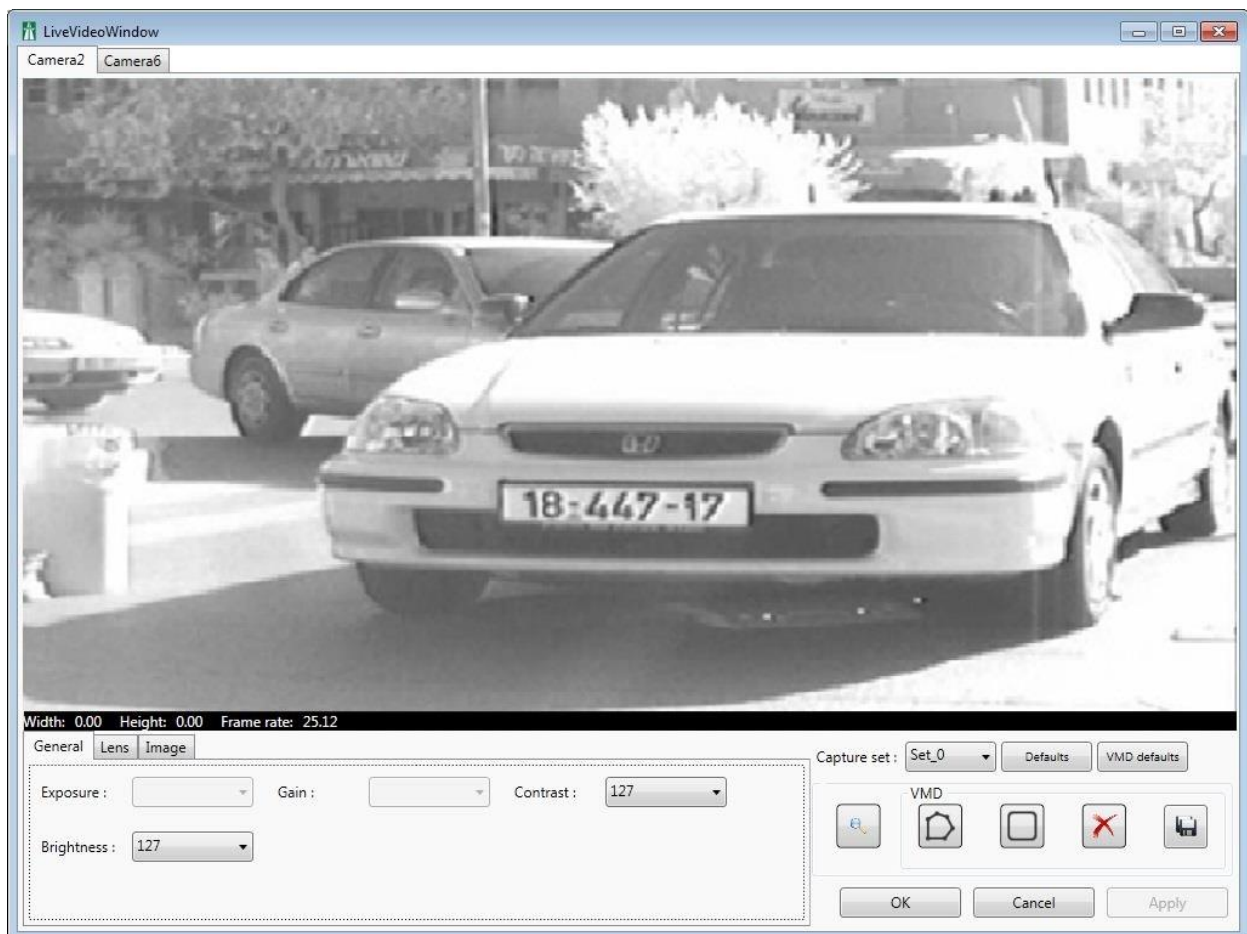

Figure 25: Live Video Window

NOTE

Camera models used the VRS may not support all of the user-interface controls described in this chapter. Unsupported controls appear as grayed, and are not operable.

In addition, the following information appears in the black background at the bottom of the viewer:

Parameter	Description
Width	Width of currently defined VMD polygon
Height	Height of currently defined VMD polygon
Frame Rate	Live video frame rate, in frames/second

Table 23: Live Video Viewer Settings

At the bottom-left side of the Live Video Window are three tabbed sub-windows that are used to configure the real-time video stream:

♦   General sub-window

♦   Lens sub-window

♦   Image sub-window

At the bottom-right side of the Live Video Window is the VMD/Capture section.

5.2   General Sub-Window

The General sub-window controls the intensity of the picture. The sub-window appears in Figure 26 below.

Figure 26: General Sub-Window

You can control the following settings from the sub-window:

Parameter	Description
Exposure	The per-frame exposure time lapse, in microseconds
Gain	The camera's gain setting (0 = minimum, 255 = maximum)
Contrast	Contrast level (0 = lowest, 255 = highest)
Brightness	Brightness level (0 = lowest, 255 = highest)

Table 24: General Sub-Window Settings

5.3   Lens Sub-Window

The Lens sub-window is used to control the camera lens. The sub-window appears in Figure 27 below.
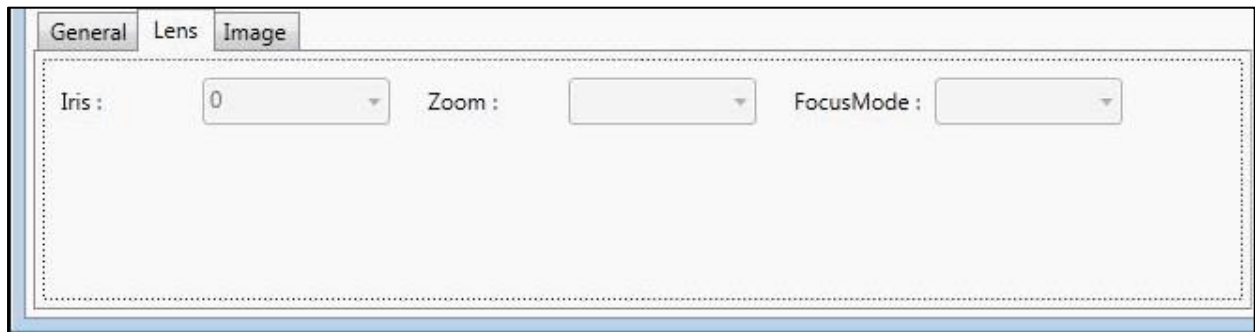

Figure 27: Lens Sub-Window

You can control the following settings from the sub-window:

Parameter	Description
Iris	The degree of the iris aperture opening (0 = fully open, 255 = fully closed)
Zoom	Not supported in current version
FocusMode	Not supported in current version

Table 25: Lens Sub-Window Settings

5.4   Image Sub-Window

The Image sub-window is used to process the image for display. The sub-window appears in Figure 28 below.
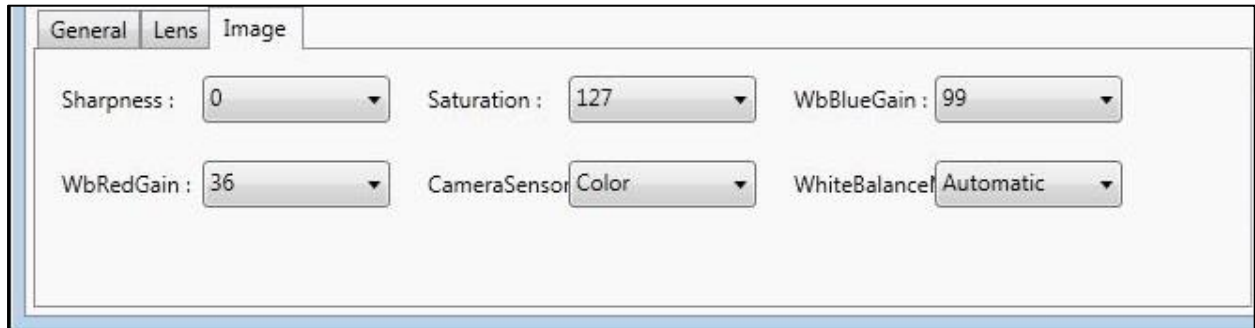

Figure 28: Image Sub-Window

You can control the following settings from the sub-window:

Parameter	Description
Sharpness	Sharpness level (0 = lowest, 255 = highest)
Saturation	Saturation level (0 = lowest, 255 = highest)
WbBlueGain	White-balance (corrects yellowing of images) *blue* gain, (0 = minimum, 255 = maximum)
WbRedGain	White-balance (corrects yellowing of images) *red* gain, (0 = minimum, 255 = maximum)
Gamma	Gamma correction value (0 = minimum, 255 = maximum)
White Balance Mode	Automatic or manual

Table 26: Image Sub-Window Settings

5.5   Capture/VMD Section

The Capture/VMD section is used to configure the software-based Video Motion Detection (VMD) capture of images. The sub-window appears in Figure 29 below.
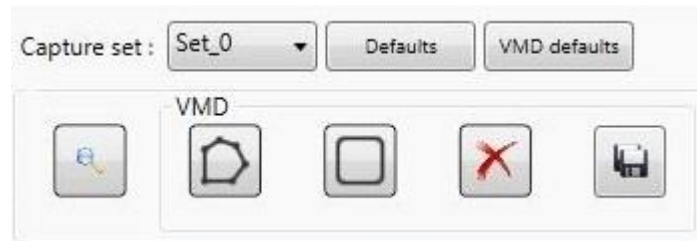

Figure 29: Capture/VMD Section

The buttons in the bottom row become *yellowed* when activated. They remain yellow unit until another button is activated, or until the button is pressed again (deactivated).

The table below describes each button and its functionality:

Button	Function	Description
Set_0 ▾	Select Capture Set	Modify the capture parameters according to capture set selected
Defaults	Defaults	Restore the default capture parameters
VMD defaults	VMD Defaults	Set VMD regions to defaults
🔍	Zoom	Zoom In/out
⬠	Polygon	Draw a VMD polygon
▢	Rectangle	Draw a VMD rectangle
✗	Delete	Delete VMD areas
💾	Copy	Copy defined VMD areas to all capture sets

Table 27: Capture/VMD Section Buttons